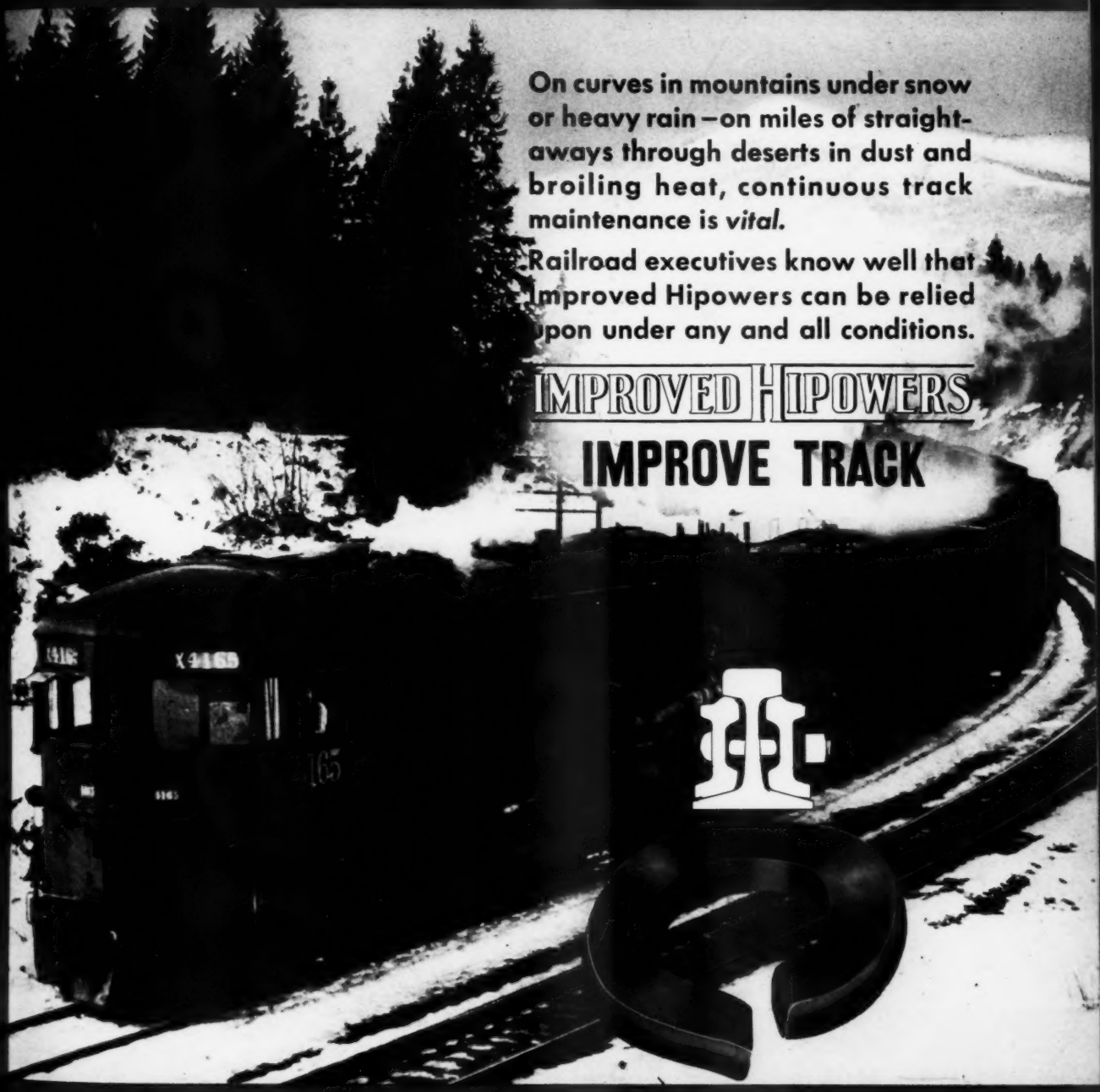
Railway
FEBRUARY, 1949

Engineering and Maintenance

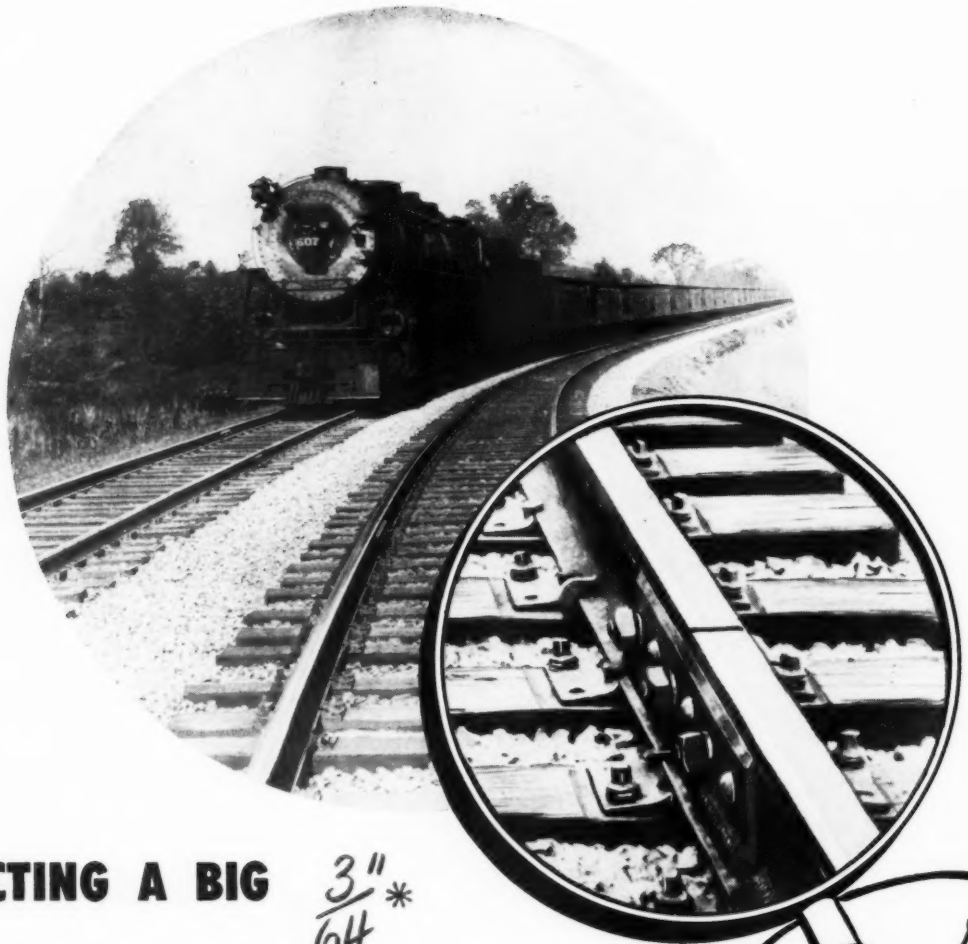


On curves in mountains under snow or heavy rain—on miles of straight-aways through deserts in dust and broiling heat, continuous track maintenance is *vital.*

Railroad executives know well that improved Hipowers can be relied upon under any and all conditions.

IMPROVED HIPOWERS
IMPROVE TRACK

THE NATIONAL LOCK WASHER COMPANY, NEWARK 5, N. J., U. S. A.
A COMPLETE LINE OF RAILWAY SPRING WASHERS



PROTECTING A BIG 3/64"*

TO CUT RAIL JOINT MAINTENANCE COST

* Experience has proven that when rail-end wear and batter reaches a depth of 3/64", it is noticeable in the riding quality of the track and that, from this point, if the condition is not corrected, deterioration of rail ends and joint structures is greatly accelerated.

Reliance Hy-Pressure Hy-Crome Spring Washers help to protect this vital 3/64" by keeping rail joint bolts *tighter longer* and postpone the necessity for costly rail-end conditioning and joint bar reforming and shimming. The inherent reactive pressure in Reliance Hy-Pressure Hy-Crome Spring Washers automatically compensates for dimensional changes in the rail joint assembly. This reduces the possibility of rail end batter and chipping, thus extending the period between maintenance operations and reducing costs.

Edgemark of Quality

Reliance **HY-PRESSURE HY-CROME** *spring washers*

EATON

EATON MANUFACTURING COMPANY

RELIANCE DIVISION
MASSILLON, OHIO

Sales Offices: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

IT'S PROVED ITSELF

Adjusting switch points. Sliding aside a cover on the Model 51 exposes the shim adjustment device.

THROUGH THE YEARS

When the first New Centuries were placed in service, most of you were probably too young to be interested in switch stands. For that was a good many years ago; so many that it takes an old-time railroad man to remember.

Today's New Century is the best of a long and highly-regarded line. With parallel throw, it is a safe stand for the switchman to operate. Maintenance is low, for the mechanical principles of the stand are simple. The New Century is so thoroughly dependable that it's like your arm — taken for granted.

The Model 50 is designed for use with an adjustable connecting rod. Model 51 has an accessible shim device built into it, so that switch-point throw can be adjusted within the stand proper. Both the 50 and the 51 stands can be furnished in low and intermediate types.

The New Century is used with heavy rail . . . 60-lb and up . . . in main-line, branch-line, and yard work. There are probably some near you. Ask a Bethlehem man to point them out and go over them feature by feature.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

BETHLEHEM *NEW CENTURY* SWITCH STAND

Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., post office. Address communications to 105 W. Adams St., Chicago 3, Ill.

BUY STEEL TAPES WITH EASY TO READ MARKINGS THAT ARE DURABLE

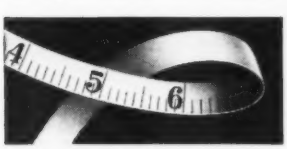
Jungle dampness . . . immersion in sea water . . . chemical fumes—these and many more rugged war time tests have proven Lufkin Chrome Clad to be an outstanding development in measuring tapes.

The illustrations below show why they are the first steel tapes with both durable and easy to read markings, features every tape user will welcome. The hardened steel base is of remarkable toughness and flexibility.

Over this goes a rust resistant coating—next, multiple coats of electro-plating—and then a heavy chrome plating with a non-glare satin finish. Against this light-absorbing surface the jet black markings stand out sharply, easy to read in bright or poor light.

And notice how the markings are bonded to the steel base—sunk below the chrome surface to protect them even against concrete or gravel wear.

If you want to sell a tape that will not crack, chip or peel—a tape that will assure customer satisfaction and repeat sales—sell Lufkin Chrome Clad steel tapes.



KINKS RARELY BREAK THEM

A tough flexible "kink-resistant" steel protects against line breakage, and saves time as well as repair expense.

DIAGRAMMATIC CROSS-SECTION VIEW

1. Hardened Steel Tape. 2. Rust Resistant Coating. 3. Multiple Coats of Electroplating. 4. Hard, Smooth, Non-Glare Chrome-Plating. 5. Black Markings Bonded to Steel, Sunk Below Surface.

EASY TO READ IN ANY LIGHT

Durable, easy to read markings stand out sharply against the non-glare, chrome surface, even after years of tough usage.

"RANGER" Model... Lufkin's Chrome Clad tape specially designed for engineers. The sturdy steel line—only ¼" wide to reduce wind resistance and provide compactness—is readily detachable from case. Permanent jet black markings are available in either feet, inches and eighths or feet, tenths and hundredths. Zero falls at end of line. Rust resistant steel liner protected by hand stitched leather case.

Buy LUFKIN

PRECISION TOOLS • TAPES • RULES FROM YOUR DISTRIBUTOR

THE LUFKIN RULE COMPANY

Saginaw, Michigan • New York City • Windsor, Canada

THE NORTHWEST, because of its ease of operation, ease of convertibility and smooth travel gives you a versatility that adapts it to handling almost every material handling and excavating job that you may be up against.

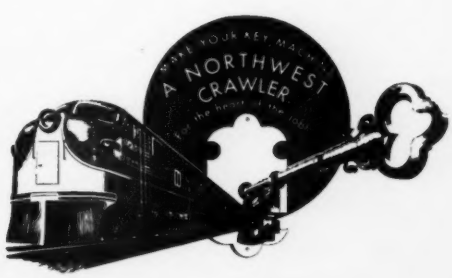
Your Northwest brings you ease of operation through the "Feather-Touch" Clutch Control. It is unaffected by temperature or weather and your Northwest cannot be shut down because of control failure.

Easy conversion from Shovel to Crane or Dragline allows you to be readily prepared with the most efficient equipment for the job in hand.

The Northwest Crawler with its easy steering permits the Northwest to negotiate rails and tough going, load and unload itself under its own power on a standard flatcar or drop-end gondola, travel from car to car and work from the car almost as easily as from the ground.

Here is a real railroad machine proved on most of the country's Class I railroads. You need it for the *Key Spots!* It is a machine you can depend on in the heart of the job. Plan ahead to have one. Let us tell you how. Ask for details.

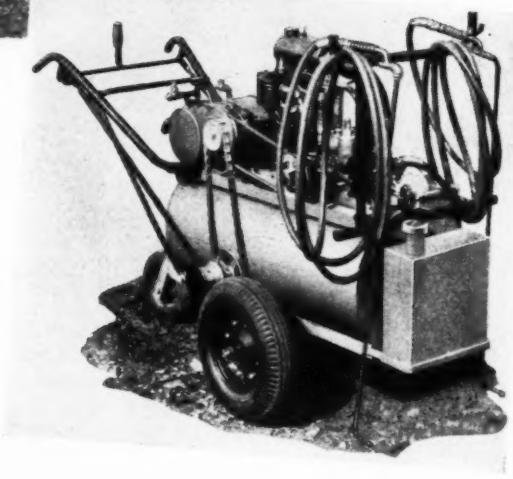
NORTHWEST ENGINEERING COMPANY
1513 Field Bldg., 135 South LaSalle St., Chicago 3, Ill.



NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL

For Fast Thorough Joint Oiling . . .



USE A Woolery SELF-PROPELLED OFF-TRACK JOINT OILER

True lubrication depends upon always having oil where it is needed when it is needed. The WOOLERY Off-Track Joint Oiler accomplishes this by using heavier lubricants which are heated and then sprayed into the joints by pressure. Not only is proper lubrication assured, but large time and money savings are effected as heavy lubricants last longer and fewer applications are required than when using lighter oils.

Self propelled by a four cycle air cooled engine which also drives a rotary gear pump, the WOOLERY Off-Track Joint Oiler is easy to handle. Only 30" wide, it can be readily operated . . . or turned completely around . . . between double tracks. Three men can spray joints on 1½ miles of track per hour. Convenient lift handles are provided for crossing over tracks or switches.

Means is provided for continuous oil circulation so that spraying may be immediately resumed after work is interrupted by passing trains.

Rugged construction and simple effective design assure long continuous service. Prompt delivery.

Write for illustrated bulletin No. 175 for complete specifications.

WOOLERY MACHINE COMPANY

MINNEAPOLIS — Pioneer Manufacturers of — MINNESOTA

RAILWAY MAINTENANCE EQUIPMENT

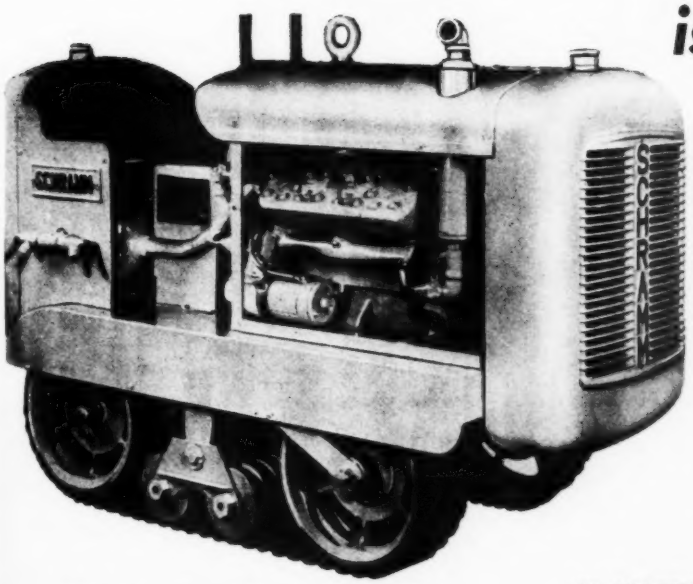
RAILWAY WEED BURNERS · MOTOR CARS · TIE CUTTERS · TIE SCORING MACHINES · RAIL JOINT OILERS · CREOSOTE SPRAYERS · BOLT TIGHTENERS

EXCLUSIVE EXPORT REPRESENTATIVES: PRESSED STEEL CAR COMPANY, INC., PITTSBURGH, PENNA.

Can you use these features in your next compressor?

FLEXIBILITY	60 cubic feet actual air capacity. Right for four tampers or similar tools. Add more units for bigger jobs.
HANDINESS	Crawler treads quickly spot the machine anywhere over the toughest surfaces.
PORTABILITY	Self-loaded on rail dolly or trailer for moving to the job.
COMPACTNESS	Motor and compressor balanced in an automotive V-8 block. Entire machine only 88 inches long by 52 inches high. Weight 2600 pounds.
VERSATILITY	A double function tool. Perfect for any compressed air task. Attachments for backfilling, towing, mowing, power take-off, etc.

...then SCHRAMM'S MODEL 60 CRAWLER is for you!



NO doubt about it; the Schramm Model 60 Crawler is the compressor that fills a great need in railroad maintenance. It is perfect for spot tamping or any of the air jobs on right of way, bridges, buildings, or construction. Then when you need a machine for towing, backfilling, or operating power machines there are attachments to make the Model 60 Crawler fill the bill. Details? Just write Railway Sales Department for bulletin FC 48.

Other Schramm portable compressors—wheel, railcar, and crawler mounted—to 315 cubic feet capacity.

SCHRAMM INC.

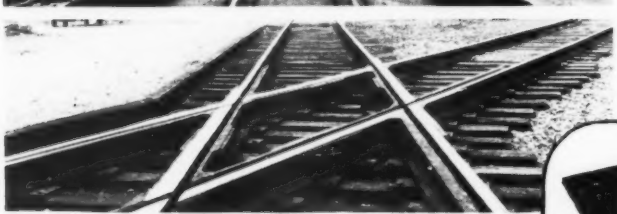
THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

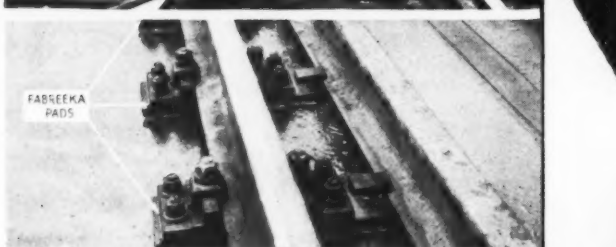
For additional information, use postcard, pages 115-116

FABREEKA

ABSORBS IMPACT SHOCK AND VIBRATION ON BRIDGES, CURVES, SWITCHES, AND TURNTABLES

The physical properties of Fabreeka, — great strength; minimum permanent set; controlled resiliency; high damping value and long life make Fabreeka the ideal material for use beneath crossings, cross-overs, and switches; on curves; in turntables; and on steel and concrete deck bridges.





At *crossings, cross-overs,* and *switches* Fabreeka pads between ties and tie plates increase the life of manganese points by cushioning impact blows from the wheels. Fabreeka's slow recoil from "compression" insures cushioning without bounce. Mechanical wear of ties is also reduced.

On *curves,* the mechanical wear on ties from plate cutting is eliminated. The frequency and expense of regauging track is greatly reduced. Fabreeka pads keep spikes from lifting.

In *turntables,* Fabreeka reduces impacts through application under end tie plates; under end tie plates of approach tracks; over bearings of turntable trucks; and under tie plates of circular rail.

***Used between the rail and the steel or concrete deck of bridges,* Fabreeka eliminates the use of ties and ballast. This reduces the foundation depth required, yet leaves proper clearance for underpass, and yields sizeable savings in excavating and concrete work.**

FABREEKA PRODUCTS COMPANY, INC.
222M SUMMER STREET
BOSTON 10, MASSACHUSETTS

IT PAYS

to Specify Fabreeka

FABCO TIE PADS

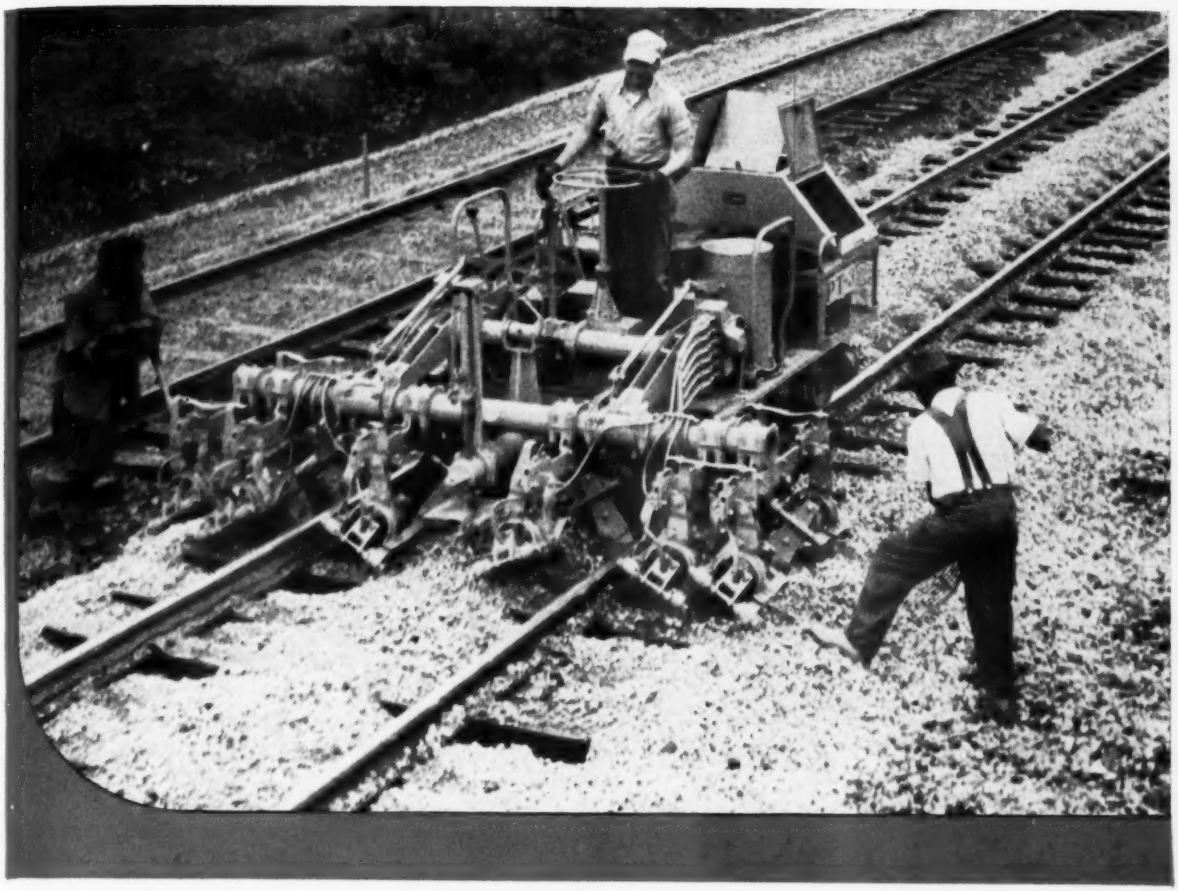
For Open Track

Fabco Tie Pads reduce the mechanical wear of ties, and are especially recommended for use on ties in curves, bridges, and switches where tie life is relatively short and the cost of renewal, high. Withstand extreme temperatures, moisture, mildew, sand. Spikes do not have to be driven down a second and third time.

Longer Tie Life with Fabco Tie Pads

- resilient
- no set — no loose spikes
- no renewals required

Made By The Makers of Fabreeka



"A RAIL LENGTH OF PERFECTLY TAMPED TRACK EVERY 4½ MINUTES . . .

with the JACKSON MULTIPLE TAMPER

Just one operator . . . and 16 High School Boys"

. . . and this rate was maintained under traffic conditions averaging 3 trains an hour, requiring 20 "set-offs" a day. Under a foreman's supervision, these boys handled the jacks (using the Multiple Jack System), spaced and straightened ties before tamping, fed ballast to the tampers, and uniformly spread ballast ahead of the machine. In addition, some of the boys frequently assisted a following section gang to line the track.

That's just one report from a number of leading roads indicating what can be accomplished with this remarkable machine. In each case perfect track is put up in one operation, no follow-up or smoothing operation is necessary. The track stays "put"! Let us tell you more about it.

ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Mich. ★

having trouble with "ORNERY" SPIKES?

. . . you can pull 'em ALL with a NORDBERG

SPIKE PULLER

● By getting spikes out faster your entire rail laying operation can be geared to top speed. The Nordberg Spike Puller gets *ALL* the spikes — including crooked, "throat-cut," and small head spikes which are tough to pull with hand tools. The Spike Puller is power driven, simple in design and built to give years of trouble-free service. Switch to modern, efficient Nordberg Spike Pullers—they pay for themselves in a short time. *Write for complete details.*

NORDBERG MFG. CO., MILWAUKEE 7, WIS.

features . . .

- Pulls from 30 to 45 spikes per minute.
- Pulls spikes on bridges, guard rail, switch-points—easier, safer.
- Self-contained unit . . . 6 H.P. engine exerts 12,000 pounds upward pull.
- Pulls spikes straight — greater salvage value.
- Does the work of 12 men.
- Pulls crooked, "throat-cut," and small head spikes.

R249

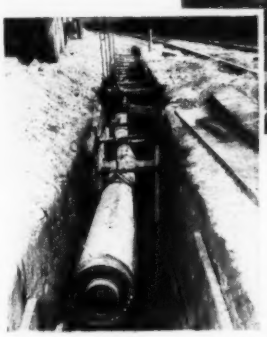
NORDBERG TRACK MAINTENANCE MACHINES

ADZING MACHINE • SPIKE PULLER • TRACK WRENCH • SPIKE HAMMER
RAIL DRILL • POWER JACK • CRIBEX • RAIL GRINDER • TRACK SHIFTER

FLEXIBILITY *and* STRENGTH *of* RIC-WIL CONDUIT PERMITS SHALLOW INSTALLATION *of* STEAM LINES

-even under Railroad Loadings

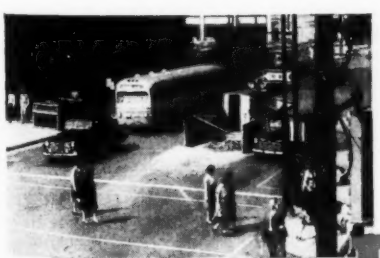
Underground steam line between RR sidings with expansion loop extending under tracks.



21 ft. Ric-wiL Prefabricated Insulated Pipe unit lowered into trench alongside tracks at RR passenger station without interrupting rail traffic.

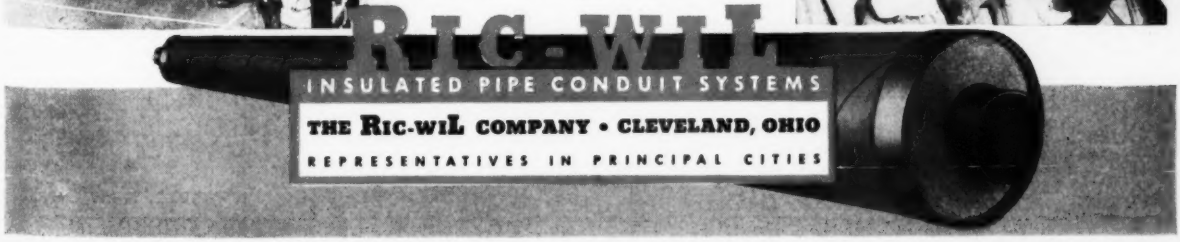
The heavy-gauge helically corrugated shell used in Ric-wiL Prefabricated Insulated Pipe Units makes possible a resilient construction of high beam strength, which can safely be installed under E72 RR loadings with only 3 feet of ground cover, and under E90 loadings with only 5 feet. Because of this and other exclusive Ric-wiL features, the trend of engineering departments of railroads is to specify Ric-wiL for all underground steam lines. It is possible to jack Ric-wiL through existing right-of-ways and to install steam lines without disturbing sidewalks, pavement or tracks and without permanent deformation of roadbeds, thus saving both installation and maintenance expense.

Secret of the strength and flexibility of Ric-wiL units is in these corrugations. Seam-welded, helically corrugated, heavy gauge galvanized iron shell with full round smooth ends and special Ric-wiL coupler, provide pressure-tight construction.



(Left) Normal traffic was maintained on this busy downtown street while Ric-wiL units were installed under pavement. Units were jacked through from building basements and joined to utility's steam main at manhole in center of street. *(Right)* Close-up of manhole showing auger crew and tool for drilling under pavement.

See the Ric-wiL Booth at the NRAA Exhibit, Chicago, March 14-17



RIC-WIL

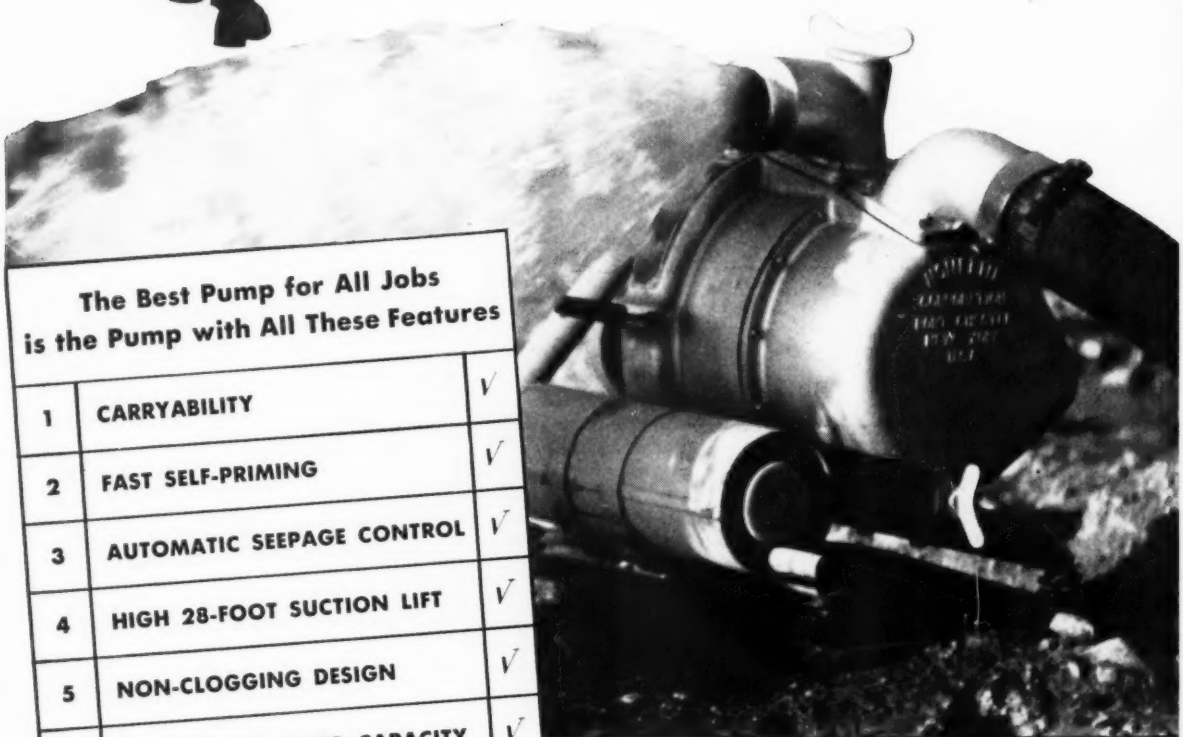
INSULATED PIPE CONDUIT SYSTEMS

THE RIC-WIL COMPANY • CLEVELAND, OHIO

REPRESENTATIVES IN PRINCIPAL CITIES

Homelite Carryable Pump ...with 9 Big Features

It weighs only 85 pounds... complete with built-in high-powered gasoline engine... and when it comes to performance, its nine big features are nine big reasons why a Homelite *Carryable* Pump is the best pump for all jobs... *your* jobs.



The Best Pump for All Jobs is the Pump with All These Features		
1	CARRYABILITY	√
2	FAST SELF-PRIMING	√
3	AUTOMATIC SEEPAGE CONTROL	√
4	HIGH 28-FOOT SUCTION LIFT	√
5	NON-CLOGGING DESIGN	√
6	MAINTAINED RATED CAPACITY	√
7	DISCHARGE PRESSURE	√
8	DEPENDABILITY	√
9	SIMPLE DESIGN AND OPERATION	√

See for yourself

Write today for our new illustrated bulletin No. L-503 that tells the *complete* story and shows how you can get faster, better pumping with Homelite *Carryable* Pumps.

HOMELITE

CORPORATION

202 RIVERDALE AVENUE, PORT CHESTER, NEW YORK

MANUFACTURERS OF HOMELITE *CARRYABLE* PUMPS · GENERATORS · BLOWERS · CHAIN SAWS

Why the WELD?

It is true that the welded hold-down lug is the cheapest and most reliable method of holding spring against rail base under a pressure of several thousand pounds.

Any other method which is as STRONG and RELIABLE will cost more than three times as much money. Any method that delivers less strength and reliability, we feel, may result in failures.

After exhausting all other means, the welded hold-down part was determined to be the most economical and reliable. This enables us to make the 8 claims herewith not incorporated in any other anchor.

Welding time is less than one minute.

Exclusive Features

1. **All Anchor Maintenance eliminated.**
2. **Failures eliminated.**
3. **Cannot be injured during installation.**
4. **A one piece (after weld is made) two-way compression anchor.**
5. **All Springs compressed on equal amount—do an equal share of work.**
6. **Remains constantly engaged from time it is installed.**
7. **Long spring—last third of distance spring is deflected, poundage does not increase. This is a compensating factor to take up for wear and erosion.**
8. **UNIVERSAL: This two-way anchor is applicable to any weight of rail or design of tie-plate and is JUST AS EFFECTIVE ON RELAID, WORN RAIL AS ON NEW RAILS.**

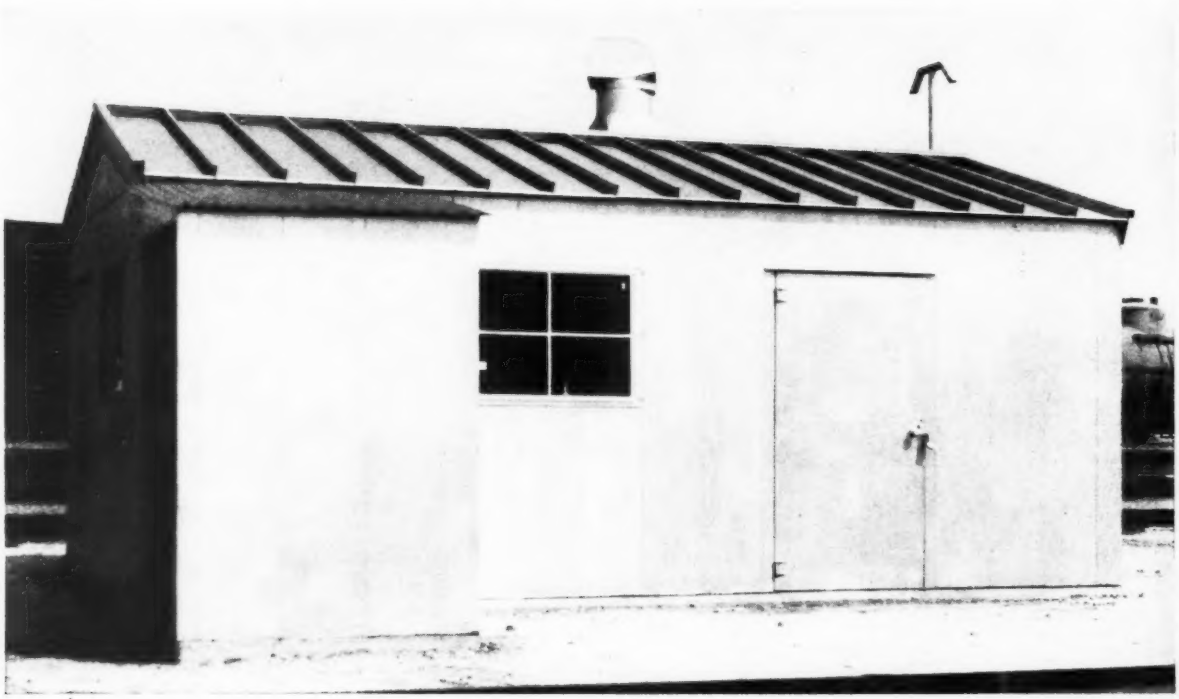
The New NO-CREEP RAIL ANCHOR

Simplicity is the greatest asset of this anchor. All we ask is that you investigate and compare the eight claims listed above as being exclusive. Write for further particulars.

G & H RAIL CONTROLS, INC.

Phone BE 8117 **5204 E. 15th St., Bill Glover Bldg.** **Kansas City 1, Mo.**

FIRE HATES THIS BUILDING



One big reason why Standard ARMCO STEELOX Buildings are so popular with railroad men is their fire-resistant, all-steel construction. You gain added safety for men and materials. Insurance rates are lower. And replacement and maintenance problems are simplified.

STEELOX Buildings are excellent for either permanent or temporary sites. Small bunk houses and similar structures can often be loaded onto flat cars intact and moved to a new site. Or it is a simple matter to dismantle the entire structure and re-erect it at a new location. A section gang can do the job simply and quickly. Even after several such "moves" your building remains tight and dry.

You'll like the way STEELOX Buildings stay neat and attractive year after year. There is nothing to get out of order—nothing to crack, warp or rot. Individual sections are made of 18- and 20-gage ARMCO Galvanized Steel. This durable material is two or three times heavier than ordinary galvanized roofing and siding. Long service is assured.

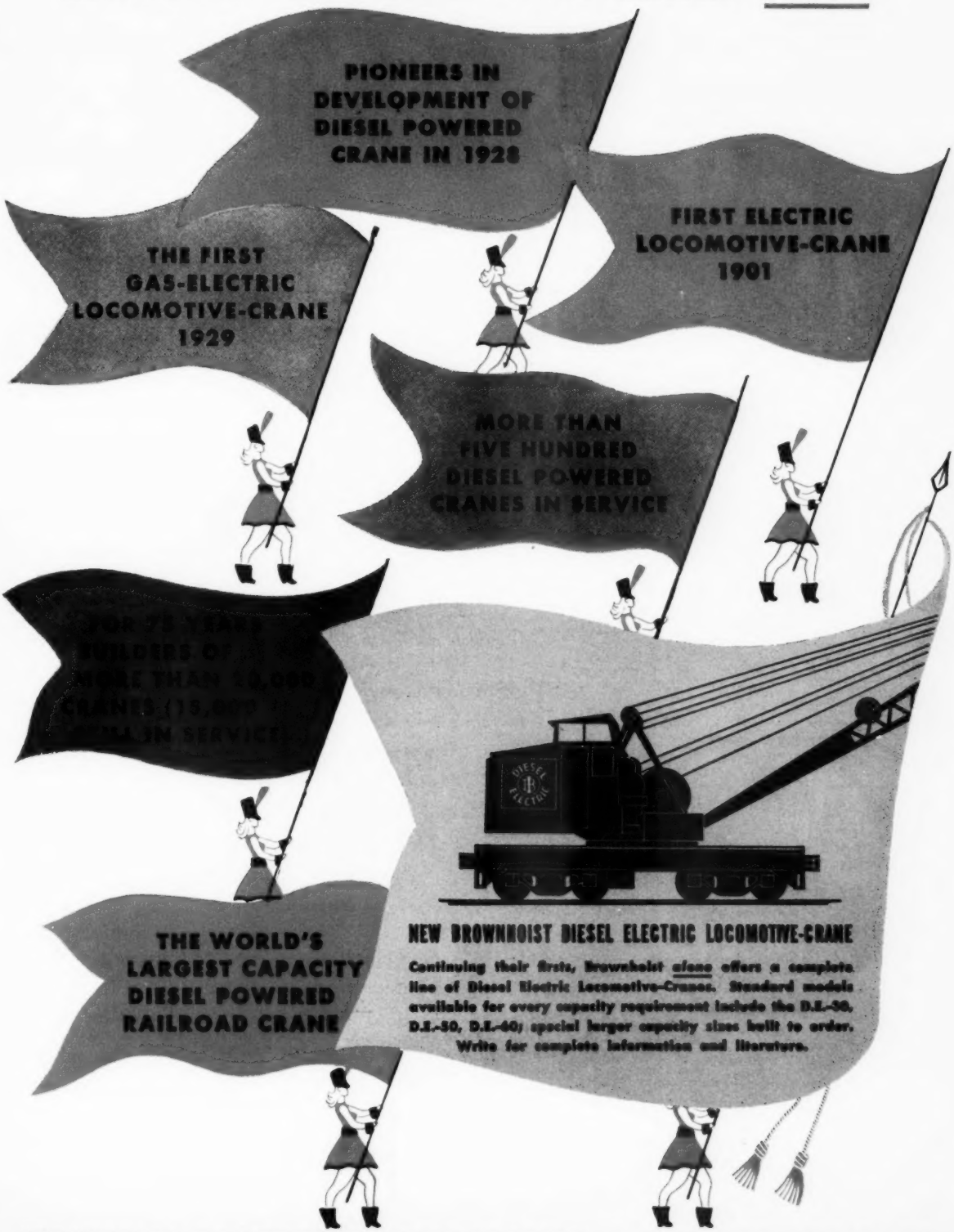
There is a type and size of ARMCO STEELOX Building to meet specific railroad needs—machine shops, tool houses, Diesel motor garages, utility buildings, yard offices, waiting stations and many others. Write us today for complete information. Armco Drainage & Metal Products, Inc., 785 Curtis Street, Middletown, Ohio.

Export: The Armco International Corporation.

ARMCO

ARMCO STEELOX BUILDINGS

BROWNHOIST'S 1949 DIESEL ELECTRIC LOCOMOTIVE-CRANE MARCHES IN THE PARADE OF BROWNHOIST *FIRSTS!*

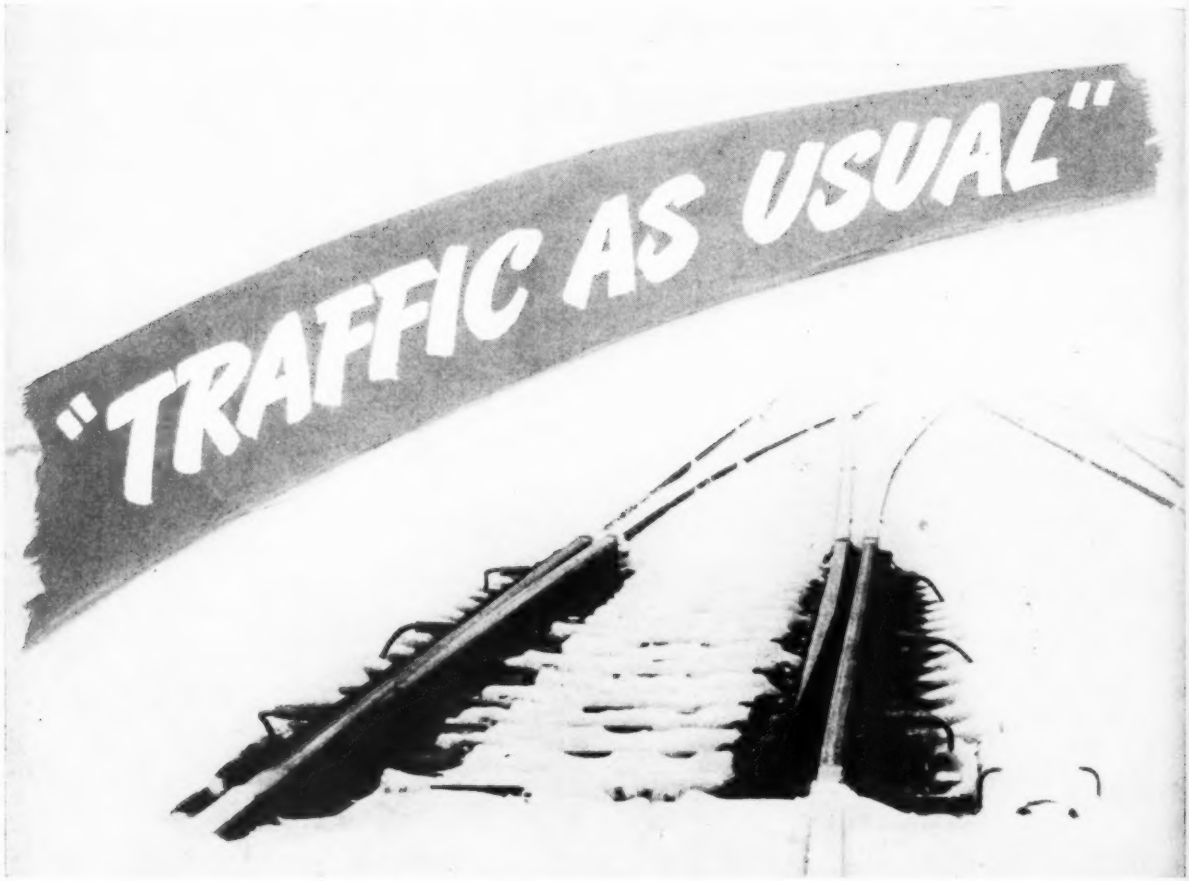

PIONEERS IN DEVELOPMENT OF DIESEL POWERED CRANE IN 1928
THE FIRST GAS-ELECTRIC LOCOMOTIVE-CRANE 1929
FIRST ELECTRIC LOCOMOTIVE-CRANE 1901
MORE THAN FIVE HUNDRED DIESEL POWERED CRANES IN SERVICE
THE WORLD'S LARGEST CAPACITY DIESEL POWERED RAILROAD CRANE
DIESEL ELECTRIC

NEW BROWNHOIST DIESEL ELECTRIC LOCOMOTIVE-CRANE

Continuing their firsts, Brownhoist *alone* offers a complete line of Diesel Electric Locomotive-Cranes. Standard models available for every capacity requirement include the D.E.-30, D.E.-50, D.E.-60; special larger capacity sizes built to order. Write for complete information and literature.

INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN

DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago. **AGENCIES:** Detroit, Birmingham, Houston, Los Angeles, Portland, San Francisco, Seattle, Spokane. Canadian Brownhoist Ltd., Montreal, Quebec.



RAIL-TEL
PROPANE GAS
SWITCH HEATER

THE modern way—the *economical* way—to keep switches free of snow and ice—is to employ propane gas. The reports are in on RAIL-TEL Propane Gas Switch Heaters—and they're all uniformly favorable. These efficient heaters won their spurs during last winter's severe storms. Today they are serving on some of our most important roads keeping switches open under a wide variety of conditions.

RAIL-TEL Switch Heaters are simple to install whether gas is supplied either from a main bulk tank or from a cylinder installation. These heaters may be operated by remote control. Write for full particulars.

THE RAILS COMPANY

General Office
178 GOFFE STREET, NEW HAVEN 11, CONN.

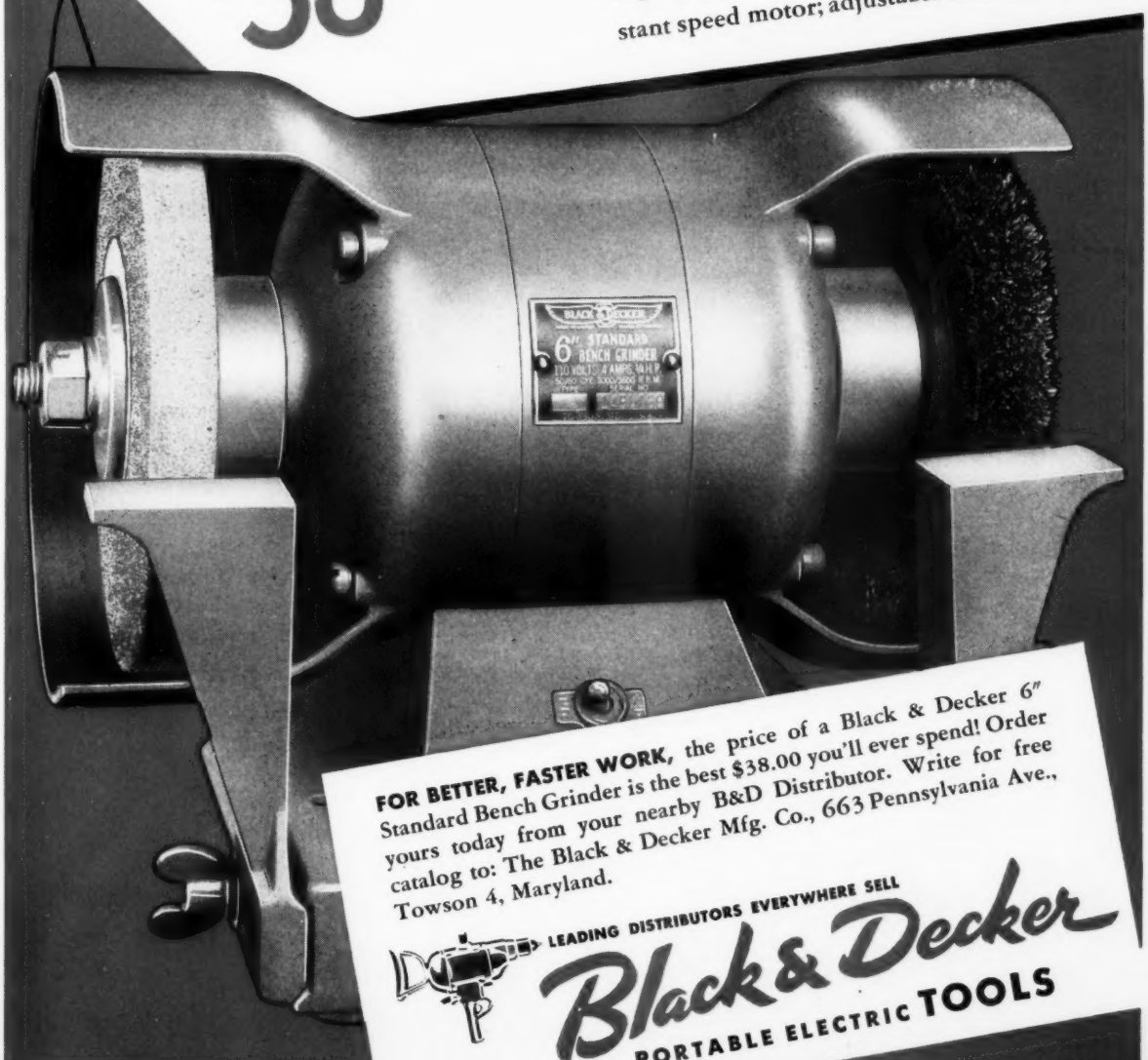
ST. LOUIS, MO. HOBOKEN, N. J. CHICAGO, ILL.

For additional information, use postcard, pages 115-116

This Small Investment Pays Big Dividends!

Black & Decker
6" STANDARD
BENCH GRINDER
ONLY
$38.00

- **Speeds Up** all "run-of-shop" grinding; tool sharpening; removing rust, old paint; cleaning metal; many maintenance jobs!
- **At This Low Price** you can use several to spot around shops. Keep them handy to mechanics. Save steps, save time!
- **Many Practical Features** you wouldn't expect to find at such a *low price*—constant speed motor; adjustable tool rests, etc.



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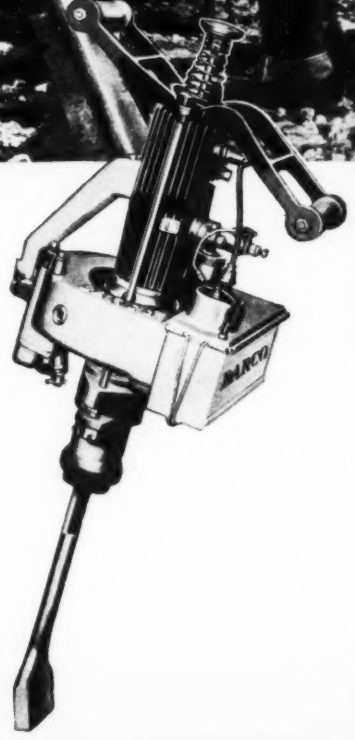

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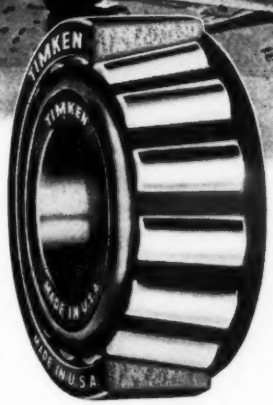

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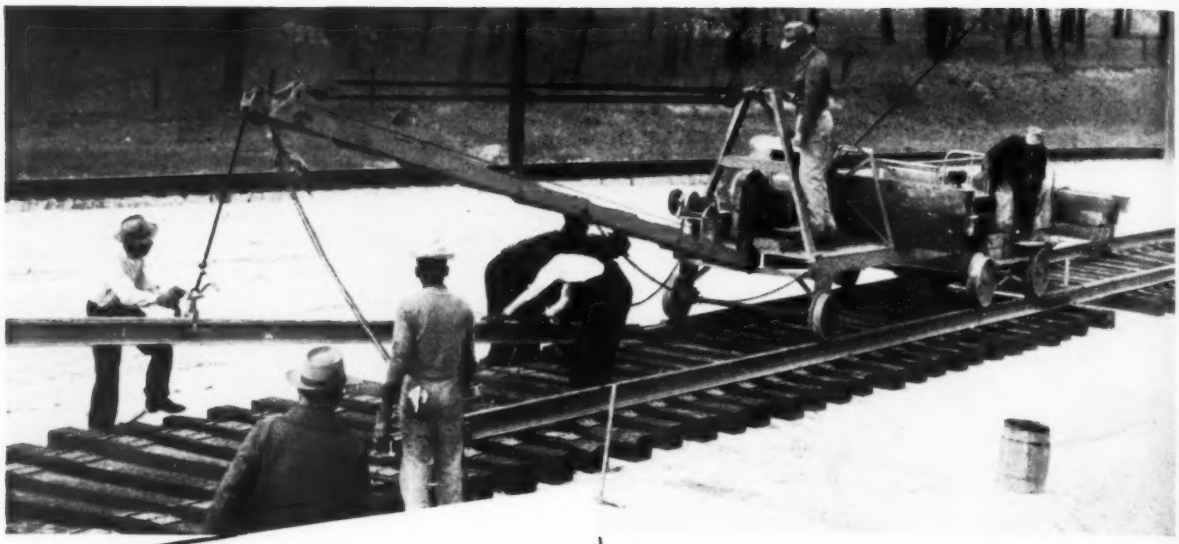
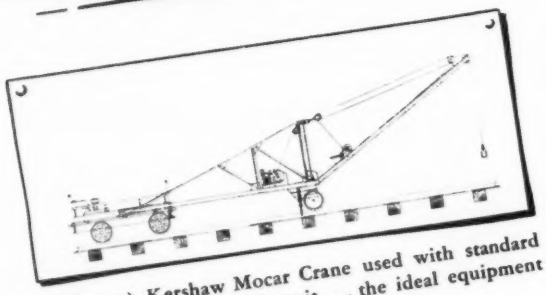
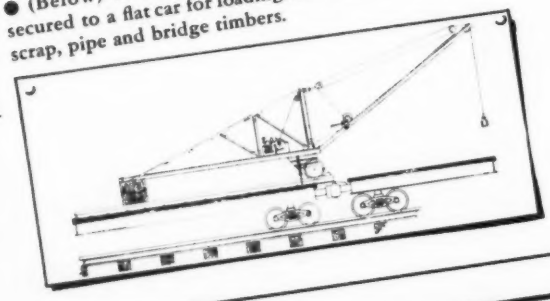




● (Above) Kershaw Mocar Crane used with standard motor car as a propelling unit . . . the ideal equipment for relaying.

● (Below) Kershaw Mocar Crane mounted on, and secured to a flat car for loading and unloading rail, frogs, scrap, pipe and bridge timbers.



Cut TRACKWORK Costs on RELAYING • CONSTRUCTION LOADING • UNLOADING *with the* KERSHAW MOCAR CRANE

● Here's a way to save more than 60% on the cost of a full-revolving crane—*and have two cranes on the job at once!*

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See diagrams at left for dual use of the Kershaw Mocar Crane; and specifications below. Write for complete data and details on the Kershaw Trial Plan.

SPECIFICATIONS: Capacity—2200 lbs. at 22' radius; Single drum hoist, gasoline engine; Boom 22', welded steel channel; Steel wheels mounted on 2" axles; Two pivot connections for motor car mounting; Weight approximately 2500 lbs.; A-Frame and boom demountable for shipment.

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P. O. Box 510 Montgomery, Alabama

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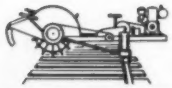

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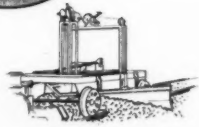
KERSHAW SPIKE SETTER CARRIAGE



KERSHAW BALLAST PLOW

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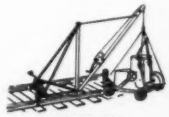

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When carbon steel frogs are oxy-acetylene flame-hardened, their running surfaces will last up to nine times as long as untreated frogs.

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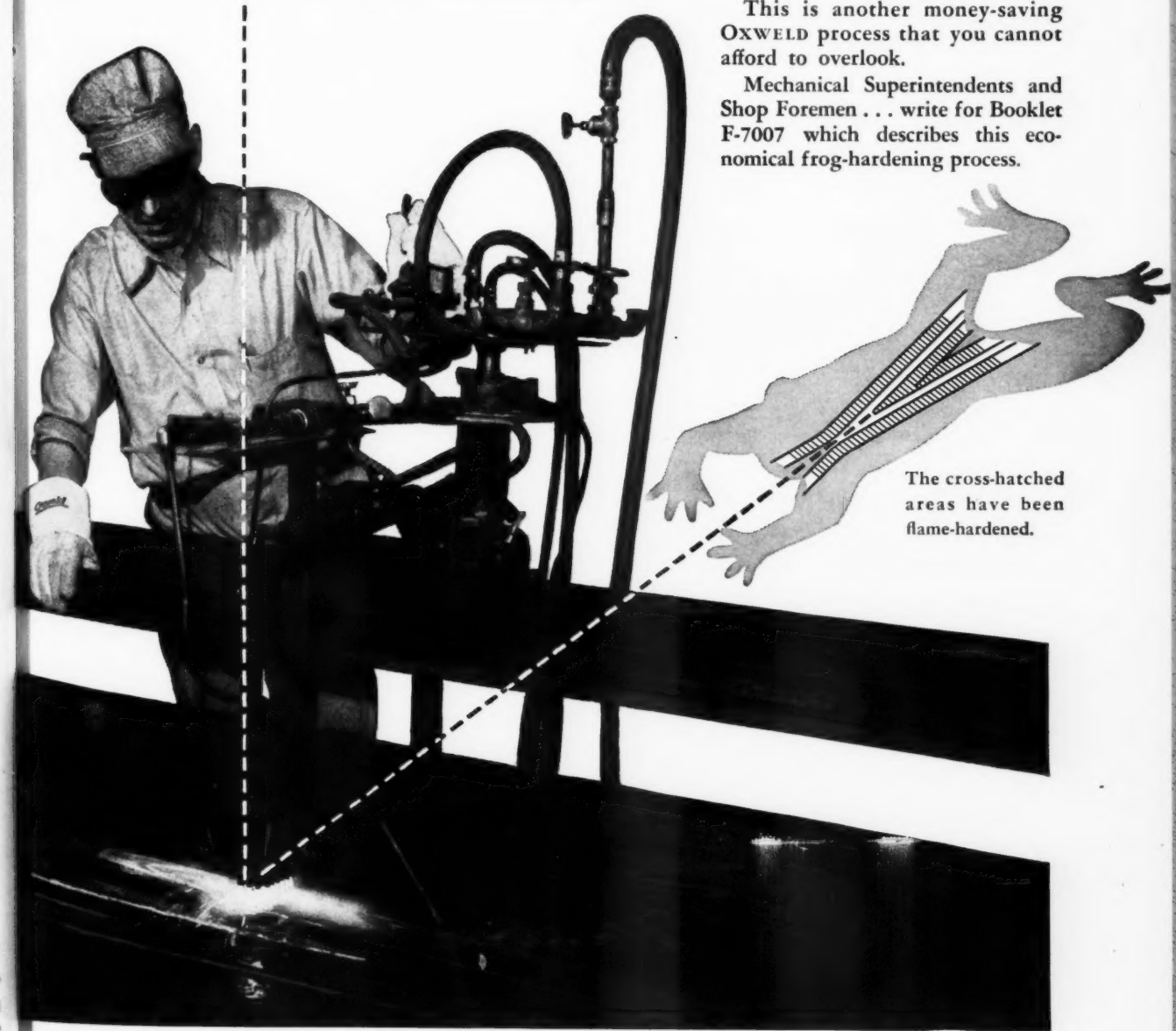
This is another money-saving OXWELD process that you cannot afford to overlook.

Mechanical Superintendents and Shop Foremen . . . write for Booklet F-7007 which describes this economical frog-hardening process.



The cross-hatched areas have been flame-hardened.

This flame-hardening blowpipe is mounted on a standard OXWELD CM-16 cutting machine.

THE OXWELD RAILROAD SERVICE COMPANY

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For more information about this proven method of track stabilization write for free, illustrated technical bulletin, "*Stabilizing Railroad Track by Pressure Grouting.*" Distributed only in the United States and Canada.

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A national organization to improve and extend the uses of portland cement and concrete through scientific research and engineering field work

'Off-Track' Maintenance

means:

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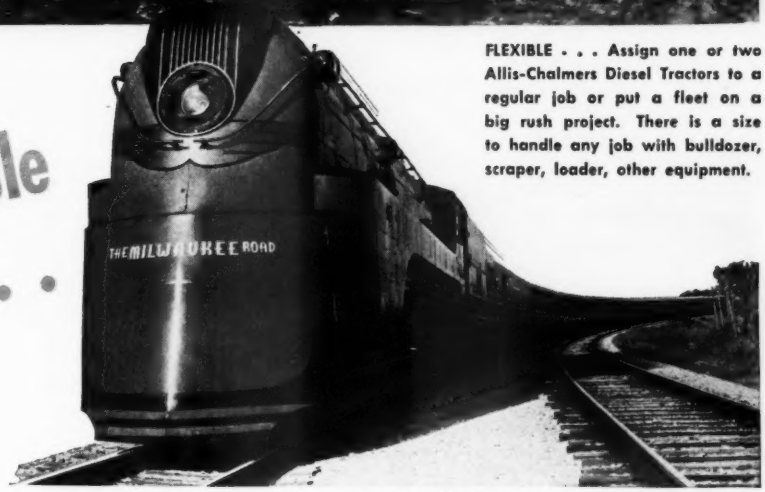

Courtesy the Milwaukee Road

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2-cycle Diesel Tractors
4 Models
11,000 to 40,000 lbs.

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TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Motor Graders
Power Units
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For mechanization of maintenance-of-way operations

"ON THE SPOT" COMPRESSED AIR

Mobile CP Crawler Compressor, propelling itself in either direction, keeps up with the job, dispensing with long air piping.

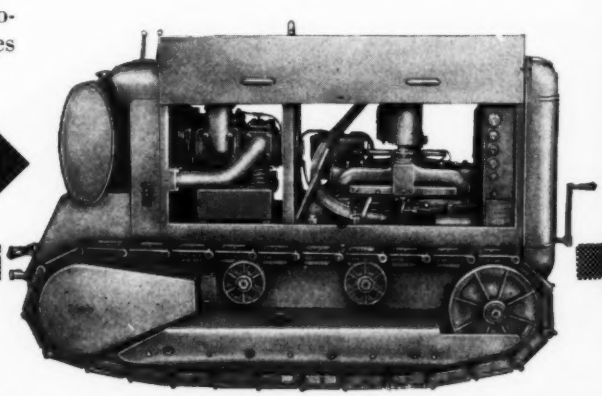
It will travel between or across rails, or on track shoulder; climb grades to 40%; turn around on its own center; not tip over at a 45° angle; propel itself onto a flat car or handcar. Available in sizes of 105 and 160 c.f.m. actual capacity.

CP Flanged-Wheel Mounted Compressors, gasoline-driven or Diesel-driven, are furnished in sizes of 105, 160, 210, 315 and 500 c.f.m. capacity.

CP PATROL COMPRESSOR

Easily transported; front and rear retractable dollies facilitate tight-spot, single-rail handling "on track;" give 4-point support "off track." Air-cooled engine and compressor are designed for year-round operation.

For nipping, small rises, and jobs where track is raised several inches, CP-3D Tie Tampers are ideal.



The mechanization of maintenance-of-way and structures work is the fastest-moving development in railroading today. Keeping pace with this development, Chicago Pneumatic offers a wide variety of air compressors, and pneumatic and electric tools, to speed maintenance operations. Write for complete information.

GETS UNDER FROGS AND SWITCHES

Compact engine design and slender lower end, permitting unobstructed view of work, make CP-5 Gasoline Tie Tamper ideal for use in narrow places.

Starts quickly by pressure on one of the grip handles. Balance is perfect, its weight being centered between grip handles. Air-cushioning of piston return stroke minimizes vibration. Efficient magneto ignition; no batteries to replace. Standard two-cycle engine operates on gasoline-oil fuel mixture, providing automatic lubrication.

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There's no quicker or easier way to run nuts, and to apply or remove bolts, studs, and lag screws, than with a CP Reversible Impact Wrench. No twisting or kick-back, and minimized vibration lessens operator fatigue. Models from 1/2" to 2" bolt size.

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Rust, scale or paint is rapidly removed from any metal surface with pneumatically operated CP Wire Brush Machine.

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Our constant research and experimentation to determine effectiveness of new formulations.

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For additional information, use postcard, pages 115-116

Flame Cleaning

prepares bridge members for painting

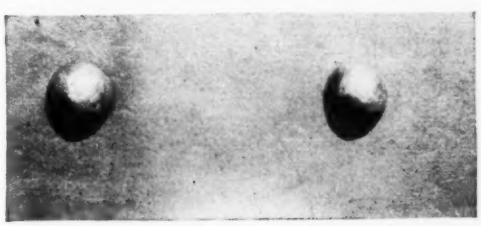
Leading railroads find that flame cleaning quickly prepares bridges, trestles and other metal surfaces for painting—*with savings up to one half the cost of hand scraping and chipping.* Further, in addition to actual dollar savings, they found that the flame cleaned surface produced a better finished paint job.

Quickly, easily and safely applied, the Airco flame cleaning process provides a clean, warm and dry surface conducive to a lasting paint job. The oxyacetylene flame cockles old paint, loosens scale and drives off hidden moisture . . . gives longer paint life to all kinds of steel structures.

New steel structures, too, should be flame cleaned before application of the prime coat of protection. This method loosens semi-tenacious mill scale and leaves no corrosion-starting dirt or hidden moisture. Future maintenance costs are reduced to an absolute minimum.

For further details write for folder ADG-1066B — "Flame Cleaning and Dehydrating Old Steel Structures", and folder ADG-1067A—"Flame Cleaning and Dehydrating New Steel Structures". Address: Dept. REM-7320, Air Reduction, General Offices: 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. Represented Internationally by Airco Export Corporation.

BEFORE — *Close-up view shows conditions of paint-lift heavy rust and scale that were met.*



AFTER — *The finished job after flame cleaning. A smooth, clean, dry surface ready for a lasting coat of paint.*

Costs come down under the Airco Plan

AIRCO **AIR REDUCTION**

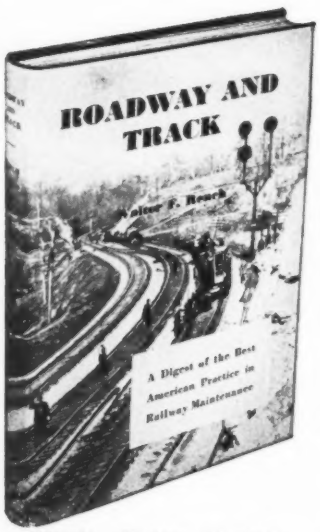
Offices in All Principal Cities

With Supplement Bringing Information Up to July, 1948

ROADWAY AND TRACK

By Walter F. Rench

Formerly Supervisor on the Pennsylvania Railroad;
Author of *Simplified Curve and Switch Work*



Third Ed. 350 pages, 101 photographs, 19 line drawings, 12 tables, index, 6 x 9, cloth, $5.00.

The third edition features the use of the latest mechanical equipment in connection with roadway and track maintenance. Older methods employed where full mechanical equipment is not available are also explained. While most of the methods described are those which are standard on the *Pennsylvania,* A.R.E.A. recommended practices and those in use on other well maintained roads have also been included.

Outstanding types of mechanical equipment used in track work are described and illustrated with action photographs. Engineering drawings show working details. The economies resulting from the adoption of modern methods are clearly outlined. Useful tables have been added to make the book suitable for reference use, as well as a practical handbook on modern methods.

For Track Supervisors

While written primarily to serve the needs of track supervisors and other maintenance officers, the new edition contains material of considerable interest to transportation and mechanical officers who require a working knowledge of the fundamentals of maintenance of way practice. Section and extra-gang foremen, who wish to acquire a broader knowledge of their work and of methods used elsewhere, will find the book helpful.

CONTENTS

Part I—ROADWAY: Essential Elements in Roadway Maintenance—The Right of Way—Drainage of Roadbed and Track—Vegetation for Banks—Economics of Roadway Machines—Labor Saving Methods and Devices in Roadway Work—Small Tools and Their Uses.

Part II—TRACK: Essential Elements in Maintenance of Track—Program for Maintenance of Way and Structures Work—The Track Obstruction—Power Machines and Equipment—Labor Saving Methods in Track Work—Track Materials and Their Uses—Practice in Rail Renewals—Practice in Rail Repair and Inspection—Maintenance of Main Tracks—Maintenance of Yards and Terminals.

Part III—SPECIAL PROBLEMS AND DUTIES: Maintenance Problems and Methods Used—Economics of Track Labor—Special Duties in the Maintenance of Way Department.

SUPPLEMENT: A 10-page Supplement describing new A.R.E.A. recommendations and changes up to July 1, 1948, can be cut for insertion in proper place.

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Send in your order today. If it is not the track book you have been looking for you can mail it back.

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30 Church Street, New York 7, N. Y.

Please send me on Ten Days Free Examination a copy of the Third Edition of ROADWAY AND TRACK by Walter F. Rench. If satisfactory, I will remit the list price of $5.00. Otherwise, I will mail the book back postpaid, without obligation.

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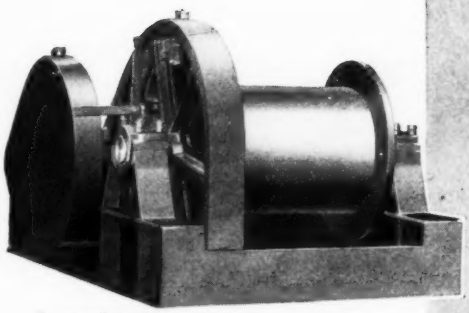

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No. 242 of a Series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO 3, ILL.

Subject: Important Questions

February 1, 1949

Dear Readers:

The forthcoming annual meeting of the American Railway Engineering Association in Chicago March 15-17, will be its Golden Jubilee Convention. Never before in the association's history has such an outstanding meeting been planned. Never before was there more promise of benefit and enjoyment for those who will attend.

Concurrent with the A.R.E.A. meeting, and in keeping with its importance this year, the National Railway Appliances Association will hold an exhibit of materials, equipment and appliances—of specific interest to you men in the engineering and maintenance-of-way departments of the railways—which promises to be one of the largest, finest and most educational ever held.

We of Railway Engineering and Maintenance are enthusiastic about both of these events, from the standpoint of both associations and what the events can mean to you. The reason for this enthusiasm is evident elsewhere in this issue, where we present a high-light preview of the special features of the convention program and a brief statement of the exhibit planned, together with a list of the companies that will be represented. Surely, even with this skeleton outline, you too will be impressed.

Of course, we call your attention to these two important coming events to be sure that you are apprised of them and their special character and significance this year, but the primary purpose of this letter is to raise a few pertinent questions, to wit: What is your railroad going to get out of these events? To what extent are you men in the higher-officer bracket going to derive benefit? And what about your junior supervisory officers—your senior engineering and maintenance officers of the future?

Obviously, but sometimes overlooked or disregarded, the extent to which your road will benefit from these events depends in large part upon what you—the readers of this publication—get out of them, and, equally obvious, the value you are to derive from them depends upon the extent to which you take advantage of their benefits.

This places a heavy responsibility upon each of you—especially you higher officers who owe it to your respective roads to attend both the convention and exhibit, and to see that as many as possible of your junior officers have an equal opportunity, through attendance, to broaden their contacts and improve their knowledge. And you junior officers—to what extent have you made your interest in these events known?

Truly, the A.R.E.A. has had a "past of achievement" these last 50 years, and, as its Golden Anniversary slogan sets forth, has a "future of opportunity". But the fulfillment of its greatest opportunities in the years ahead, with largest benefit to the railways and to you engineering and maintenance officers, can be achieved only by the greatest possible participation in its activities—of which its annual meetings are a vitally important part.

Sincerely,

Neal D. Howard
Editor

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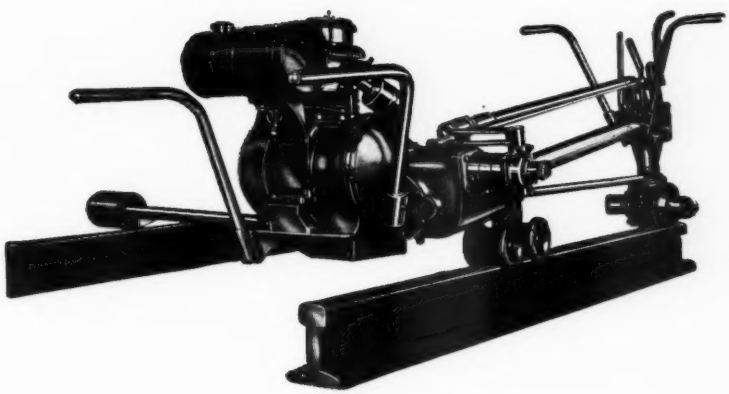

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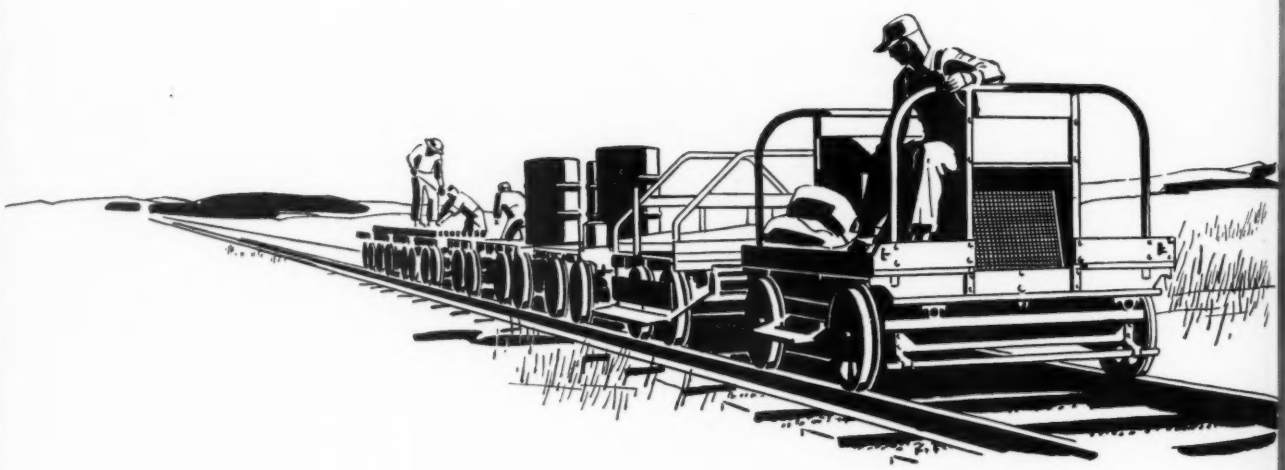

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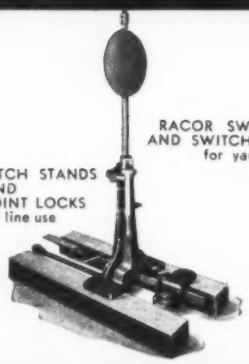
Editorials - - -



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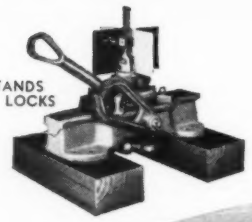

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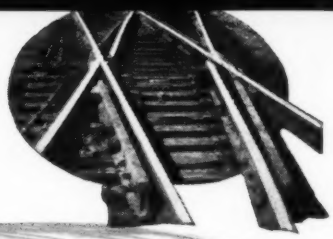

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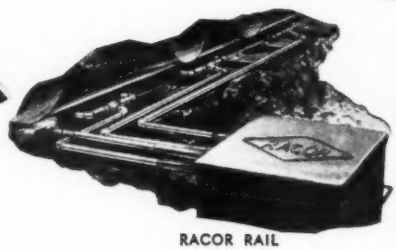

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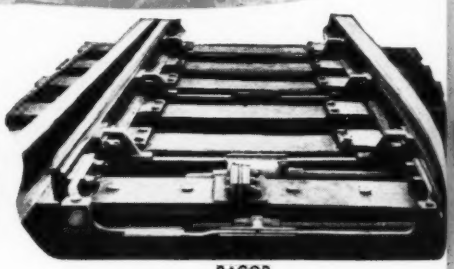

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Statesmanship—

Essential in Settling Present Wage Dispute

The National Mediation Board, in its report to Congress on January 6, warned the railroads and labor that another nation-wide railroad strike may result in compulsory measures for dealing with such disputes, and called upon both sides to settle their differences under the provisions of the law as it now stands and thus prevent any tie-up in rail transportation.

This warning came at a time when the railroads and 16 non-operating unions, including the Brotherhood of Maintenance of Way Employees, were engaged in renewed wage negotiations, based upon recommendations of a presidential emergency board for a further pay increase and a 40-hour week —with an affirmative strike ballot in the hands of the union negotiators, which they threatened to use unless they were granted something more than was recommended by the board. This situation still prevails as this issue goes to press.

Many important considerations are involved in these negotiations, and neither side has publicly stated its final position. But the threat to strike—unless—is exceedingly unfortunate, and the thought of an actual strike, tying up the Nation's railroads, is preposterous. There must be a way out—a settlement which will do justice to the employees, the carriers and the public.

But if there is no such peaceful settlement, and a strike is called, what then? One thing seems quite certain, and that is, with the public and its representatives in government in no frame of mind to be crushed under a national railroad stoppage, the strike call will be nullified by government action. This could be done either by a federal court injunction, or by an Executive Order of the President of the United States, providing that the government take over the railroads, as was done during the war, and again on May 10, 1948—or, if necessary, by both, if the brotherhoods should persist in their strike call following government seizure.

To visualize what might take place one need only recall what happened when the locomotive engineers, firemen, enginemen and switchmen refused to call off their strike set for May 11, 1948, after full recourse had been taken under the Railway Labor Act. The events in this case finally led to a permanent injunction against the work stoppage—while the roads were under government control—which the federal district court judge sitting in the case—T. Alan Goldsborough—indicated plainly he would have applied, in the interest of the public, even if the petition for it had been made outside of federal control.

Under any federal action which may become necessary in the present wage dispute, something will be gained, of course, by the public—at least temporarily—for the wheels of transportation will be kept rolling, but both the railways and their employees will have much to lose. This is true especially if the action should bring compulsory measures and prohibitions in the field of railway-labor relations. It is this which the Mediation Board fears when it urges settlement of railway labor disputes under the non-compulsory provisions of the law as it now stands—and such might well be the fear of every clear-thinking employee.

Unquestionably, the railroads, in spite of the heavy burden that would be imposed upon them by further wage increases and shorter hours—in the face of already pyramided expenses, shipper resistance to adequately-compensatory rates, and the increasing deflection of traffic to competitive transportation agencies—will make every concession that they feel is possible to a satisfactory solution of the present wage dispute—without jeopardizing the industry. It may even be expected that the carriers will accept the

recommendations of the President's emergency board, as they have accepted the recommendations of such boards in almost every earlier case. Those employees party to the present dispute should adopt the same attitude, weighing temporary gains against those factors which might weaken their industry, and thus bring permanent disadvantages to all of them.

The immediate and long-pull future of the American railways, it can be said, is largely in the hands of railway employees. With a will to work and reasonableness in their demands, which will help keep the railroads in a sound competitive position, the future can be bright for the roads and for all of their employees. If any other attitude is adopted, the future will be anything but bright, with disaster for many who now look to the railroads for their livelihood and well being. Our prayer is for statesmanship of a high order on both sides of the fence.

THE BLIZZARDS—

Proved Need of Adequate Preparation

THERE ARE many railway maintenance men who know considerably more about dealing with severe snow and ice conditions now than they did six weeks ago. This sudden acquisition of knowledge has come about as a result of the record-breaking snow storms that descended on a large area of the middle-western and plains sections of the country in January. Provided this new knowledge is put to practical use, the railroads in the area involved will be better prepared for fighting snow in the future than they were at the beginning of the January storms.

At the outset it must be said that the conditions encountered were unusually severe, and even with the best of preparations, including adequate numbers of snow-fighting units of effective types, in good repair and properly located, the railroads would still have had great difficulty in keeping their lines open. On the other hand, it can be stated with equal truth that considerably less difficulty, including fewer and shorter delays to trains, would have been encountered in many instances if the roads had been better prepared and equipped for the job.

One of the most important lessons that was learned is that it can be fatal to become lax in the matter of making preparations for dealing with severe snow storms; that it is more economical to be prepared to cope with the worst storms to be expected than it is to suffer the almost uncalculable expenses and losses caused by long delays to traffic. And it is a fact that at least some roads were caught "short" in the recent storms. Not only was effective snow-fighting equipment not always on hand in sufficient numbers at the right places, but frequently the machines available were found to be in disrepair, with the result that there was a frantic search for repair parts, particularly for rotary snow plows, some of which had not been used for a number of years.

Another lesson learned is that by getting snow-fighting equipment—plows, spreaders and spreader-ditchers—into operation at the earliest possible moment after the start of the storm and operating them at relatively frequent intervals over a given stretch of track, the situation can frequently be kept under control, avoiding the cost, danger and difficulty of attacking deep drifts later on.

There is also greater appreciation of the need for making snow cuts as wide as possible in order to minimize the danger of their being plugged again by blow-in snow or further snowfalls. Consequently, after snow cuts had been opened by rotary or wedge plows it was often found desirable to widen them, and for this purpose spreader-ditchers were found highly effective. For this operation, if the sidewalls are no more than 7 or 8 ft. high, the machine is operated through the cut in the same manner as when ditching. If the snow cut is much deeper the spreader is backed a short distance into the cut and the wings are opened and locked at a relatively small angle. Sometimes, if the surface of the snow is frozen hard, it is necessary to cut niches for the wings. The spreader-ditcher then moves out of the cut, and the snow that accumulates ahead of the wings is wasted on the fill. This process is repeated, with the machine moving progressively deeper into the cut.

As the result of their unfortunate experiences during the January snows several roads are already taking steps to insure that they will be better equipped in the future to cope with similar conditions. Other roads, fortunate in being on the side lines in this instance, will do well to take stock of their own equipment and organization to the end that they will not find themselves in the same predicament at some future time.

SCRAP DRIVE—

Railroads' Help Needed Again

THE RAILROADS consume many products made of steel, and they are particularly anxious at the moment to obtain greater supplies of new rail. Because of the increased need for steel on the part of the railroads and domestic industry generally, plus the demands of the foreign-aid programs and military requirements, the steel mills are endeavoring to enlarge their production capacity. While steel production reached a new peak of 88,500,000 tons in 1948 it is expected that this will be exceeded by 3,500,000 tons in 1949.

But there is a big "if" in these plans to get greater capacity, and that is the supply of heavy melting scrap, an important element in steel production. At present there is only a 60-day supply of such scrap and this is held inadequate, especially in the event of any emergency. The Department of Commerce is asking industry to undertake a scrap-collection campaign with the objective of salvaging a million extra tons of heavy scrap. Experience during the war years proved that the railroads are capable of greatly increasing the amount of scrap they contribute for steel-making purposes. Their cooperation is needed again—now! By doing their part they will not only be rendering a national service but will be helping to insure that their own needs for steel will be satisfied.

Confronted with numerous stretches of unstable track, highly expensive to maintain, in parts of Minnesota, North Dakota and Montana, the Great Northern began in 1946 an extensive program of track stabilization by pressure grouting. Continuing the work in 1947 and 1948, the road to date has grouted 10.75 mi. of track with gratifying results. Presented in this article are statistics giving the cost of the work and the savings being realized, along with details concerning the equipment and procedure.

A Fairmont outfit in operation, grouting a fill on the Great Northern in North Dakota

Roadbed Grouting Returns Large Profits

After the injection pipes are driven to a depth just above the clay level, as much grout is forced (below) into the roadbed as each injection point will take

• Money spent for roadbed grouting on the Great Northern has proved to be a profitable investment, according to figures compiled by the road in connection with an extensive roadbed stabilization program carried out during the last three years in western Minnesota, North Dakota and eastern Montana. These figures, comparing the cost of grouting with the savings in maintenance man-hours and the amount of gravel ballast used in resurfacing, are shown in Table 1. The savings shown are based on accurate records covering periods of one year before and one year after grouting.

The work in the vicinity of Wahpeton and Fargo consisted of grouting soft track on low (4-ft.) fills. The section west of Williston consisted of unstable fills averaging about 10 ft. in height. The work at these points was carried out in 1946 and 1947. From an examination of the figures in the table it is apparent that, in eastern Montana the savings in maintenance man-hours alone have already more

Table 1—Savings Resulting From Grouting Operations

Location	Length of section in ft.	Cost of grouting per trk. ft.	Man-Hours saved per trk. ft. per year	Ballast saved—cu. yd. per trk. ft. per year
Between Wahpeton, N.D., and Moorhead, Minn.	19,701	$1.12	0.57	0.29
Between Fargo, N.D., and Hillsboro, N.D.	10,545	1.88	0.70	0.05
Between Williston, N.D., and Saco, Mont.	8,012	1.73	1.40	0.20

than paid for the cost of grouting. At the other points the figures indicate that the savings will offset the cost of grouting in periods up to slightly less than three years.

In addition to the savings in man-hours and ballast, substantial improvements in operating conditions have been realized as a result of the stabilization work. In the territory between Wahpeton and Rustad, Minn., for example, it has been possible to eliminate slow orders of 30 to 35 m.p.h., which were required more than half the time, over numerous stretches of track. During the last year in this territory there has been a general increase in train speeds of 10 m.p.h., resulting partly from the grouting work and partly from general drainage improvements and ballasting operations.

On the line from Fargo to Grand Forks, N.D., in the vicinity of Harwood, slow orders of 25 to 40 m.p.h. that were in effect a large part of the year have been eliminated. As a result of the grouting in 1948 of 815 ft. of unstable fill at Noyes, Minn., a 10-m.p.h. speed restriction that had been in effect for many years was lifted, permitting trains to move over the section at 50 m.p.h., the normal speed for this territory. In eastern Montana slow orders had only occasionally been required, but the need for them was eliminated at all the grouted locations.

Another favorable effect of the grouting work on the Great Northern has been a reduction in the amount of shimming necessary during the winter. The road plans to investigate the possibilities of this phase further by grouting track which, while otherwise stable, heaves badly during freezing weather.

The entire grouting program on the Great Northern, including work done in 1948, for which maintenance savings data are not yet available, is summarized in Table 2.

Used Fairmont Equipment

When the Great Northern began its grouting program in 1946 it experimented with "home-made" equipment. This equipment did not prove to be satisfactory, and in 1947 the road started using Fairmont grouting outfits. During the 1948 program seven such complete outfits were in service, divided among three grouting gangs, two each for two gangs and three for the third.

A Fairmont grouting outfit consists essentially of a grout mixing unit and a number of accessories, including a dolly car for transporting the mixing unit; an inclined sand screen with hopper; a 94-gal. elevated tank with fittings and automatic nozzle; grout injector pipes of various lengths, with grout hoses and fittings; air hoses; an injector puller; a hose-repair kit; and a number of small tools. The mixing unit is a pressure vessel in which the grout ingredients are agitated by mixing paddles driven through a V-belt drive and reduction gears by a four-cycle Wisconsin gasoline engine. The pressure vessel and engine are mounted integrally on two tubular skids with chain-attached handles for lifting the assembly.

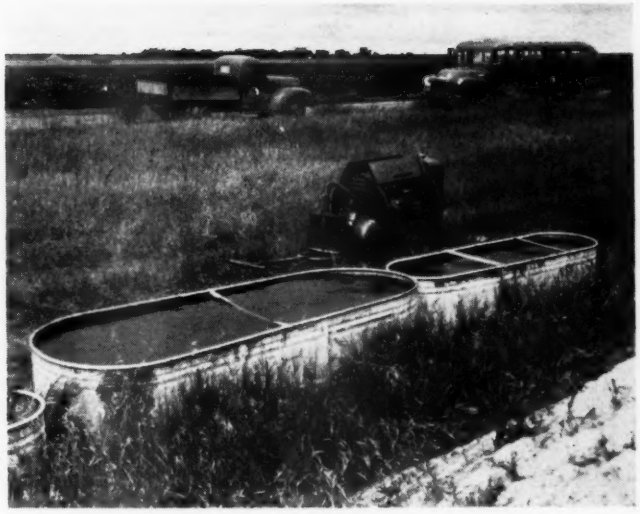
For each grouting outfit a portable air compressor provides the necessary pressure to force the grout from the mixing chamber through the hose and injectors into the roadbed. The compressor also furnishes the air to operate a pneumatic hammer used to drive the injectors into the roadbed. In operating a grouting outfit the water, cement, asphalt emulsion and sand making up the grout (see Table 2 for the various mixes used on the Great Northern) are poured through a funnel into the pressure vessel where the materials are agitated by the engine-driven paddles. The funnel is then removed, the cover of the pressure vessel closed, and, when the air pressure has built up sufficiently, the grout mixture is ejected through the hose by opening a valve. Agitation of the mixture takes place both during

Table 2—Summary of Roadbed Grouting Work on the Great Northern

Location	Year	Length of section in ft.	Grout mixture: Grout acceptance (cu. ft. per trk. ft.)	Grout mixture: Cement (cu. ft.)	Grout mixture: Sand (cu. ft.)	Grout mixture: Asphalt emulsion (gal.)	Character of track and type of instability	Cost of grouting: Trk. ft.	Cost of grouting: Cu. ft.	Maintenance data*: Man-Hours: Before grouting, per year	Maintenance data*: Man-Hours: After grouting, per year	Maintenance data*: Cu. yd. gravel: Before grouting, per year	Maintenance data*: Cu. yd. gravel: After grouting, per year
Between Wahpeton, N.D. and Moorhead, Minn.	1947	19,701	2.65	1	5	2	Soft track, 4-ft. fill	$1.12	$0.36	18,368	4,176	5,800	0
Between Fargo, and Hillsboro, N.D.	1946 & 1947	10,545	5.36	1	5	1	Soft track, 4-ft. fill	1.88	0.35	15,015	7,600	800	300
Between Williston, N.D. and Saco, Mont.	1946 & 1947	8,012	4.51	1	6	1	Splitting, 10-ft. fill	1.73	0.44	11,930	728	1,570	0
Between Rustad, Minn. and Wahpeton, N.D.	1948	10,738	4.34	1	5	2	Soft track, 4-ft. fill	1.20	0.28	.....	.....	.....	.....
Between Fargo and Argusville, N.D.	1948	879	15.68	1	5	1½	Soft track, 3-ft. fill	4.79	0.31	.....	.....	.....	.....
East of Noyes, Minn.	1948	815	45.88	1	5	1½	Sliding, 12-ft. fill	17.99	0.39	.....	.....	.....	.....
Between Williston, N. D. and Saco, Mont...	1948	6,087	5.84	1	5	1	Splitting, 10-ft. fill	3.05	0.55	.....	.....	.....	.....

*These data are based on periods of one year before and one year after grouting.

One of the Great Northern grouting gangs at work, stabilizing a soft "gumbo" subgrade in the Red River valley



Showing the stock-watering tanks used for water storage, an air compressor and a bus used for hauling the men to and from the job site

the mixing period and the injection period. Usually, the complete cycle of mixing and injection is accomplished in periods ranging from three to four minutes.

The typical organization of each grouting gang having two outfits consists of a foreman and 17 men—8 men for each grouting outfit and a truck driver. For each of the grouting outfits one man operates the mixing unit, one the air compressor, two men screen the sand, one man keeps the mixing unit charged with the grout ingredients, one man drives the injection points, one man pulls them out, and one man is stationed at the advance end of the hose to check on the grout flow and to couple and uncouple the hose from the injection points. On the jobs in Minnesota and North Dakota the men were transported to and from the work in busses. In Montana, however, road accessibility and the labor supply did not permit this and motor cars were used.

The sand required for each section of track to be grouted is hauled by work train and unloaded into piles approximately 100 ft. apart on both sides of the track. The cement is hauled to the job in sacks by truck or motor car and is stacked in the immediate vicinity of the sand piles. The asphalt, in barrels, is also handled by truck or motor car. Water storage on the job is in metal stock-watering tanks, from which the water is pumped to the elevated tank at the mixing unit by a lightweight engine-driven centrifugal pump (part of the Fairmont outfit). For much of the work in Minnesota and North Dakota water was hauled to the job by a truck fitted with a tank body. For the work described at other locations the water was hauled on push cars or, in some instances, was pumped into the storage tanks from the tenders of passing locomotives.

As will be noted from Table 2, except for two locations, one in eastern Montana, and the other near Noyes, Minn., the roadbed grouted consisted of low fills, 3 ft. to 4 ft. in height. These fills, located in the Red River valley in western Minnesota and eastern North Dakota, are composed of the natural clayey lake silts peculiar to the territory, scooped out of adjacent borrow pits during the original construction work. This material, having been deposited by glacial lakes, has a high plasticity, and when wet becomes dough-like in consistency. In those locations where water is retained in the fills, the clay flows laterally under heavy traffic, producing bulges on both sides of the fill. For many years these soft spots had been raised on gravel until the plastic soil beneath the track had been squeezed out to the level of the original ground in some cases. Prior to the decision to use the grouting method of stabilization, some of these soft sections were stabilized by removing the entire fill with bulldozers and then rebuilding it with gravel. This method was effective but very expensive.

The clayey lake silt of the Red River valley is often locally referred to as "gumbo". It is, however, a different formation than the gumbo of western North Dakota and eastern Montana, which is a weathered bentonitic Fort Union shale. The latter material, in addition to being highly plastic, increases in volume materially when wet. It is interesting to note that grouting has been very effective in stabilizing subgrades which contain either of these plastic materials.

In the grouting operations the injectors were driven in a staggered formation on each side of the track. One line of injectors was driven along the ends of the ties, with one injector at each fourth tie. The other line of injectors was driven along the ballast shoulder, each injector being located midway between two of the inside injectors. All of the injectors were driven at an angle toward the center of the track to a depth that placed their discharge ends at a level just above the clay level.

With a mixing unit located on each side of the track adjacent to the sand piles, the grout hoses were coupled to the injectors, one at a time, in succession, until the hose limit (50 ft.) was reached. The mixing units were then moved on the dolly car to the next sand piles and the procedure was continued. The grouting accomplished on the low fills amounted to about 1,000 ft. of track per six-day week, working eight hours daily.

Roadbed stabilization work on the Great Northern is carried out under the general direction of H. J. Seyton, chief engineer, assisted by R. R. Manion, engineer maintenance of way.

Uncle Sam B

One of more than 50 locations between McKinley Park and Healy (10 mi.) where the track is laid on permanently frozen ground which slides in planes down to the Nenana river. Here, the track at the right was the main line and was originally located in the same place as the new track at the left, which was built to replace it

• The Alaska — United States owned and operated railroad—will start this spring the third year's work of an extensive five-year rehabilitation program. The first two years of the roadway phases of this program have already witnessed the relaying of nearly 200 mi. of rail, heavy tie renewals, extensive bank and cut widening, heavy curve and grade reduction, large-scale reballasting and surfacing, and the rebuilding of several bridges.

The road is now inviting contractors' proposals on its 1949 roadway and track improvement program, which will include the relaying of approximately 101.5 mi. of rail, and six sections of line change, bank widening and ballasting work. Contracts for the rail relay program will include the replacing of 70-lb. rail with 115-lb. rail; the renewal of existing No. 9, 70-lb. turnouts with No. 11, 115-lb. turnouts; the renewal and respacing of ties; and the final raising of the track.

The line improvement and bank-widening work to be undertaken in 1949 will comprise essentially the widening of the subgrade from 16 ft. to 20 ft.; the elimination of sags; raising, surfacing and lining the track; standardization of curvature by the introduction of the A.R.E.A. spiral; the raising of bridges to conform to the new grade line; the extension of some culverts; and the construction of other culverts.

Left—A new five-span steel structure built to replace an old high timber viaduct. The new crossing consists of an 85-ft. center span, two 13-ft. tower spans, and two 70-ft. approach spans, all on concrete piers and abutments

After bank-widening, preliminary raising of track to ballast stakes, and renewal of rail, the track is given a final raise of about 4 in. on new ballast. Here, final surfacing is being done with Jackson electric tampers

Building Up the Alaska Railroad

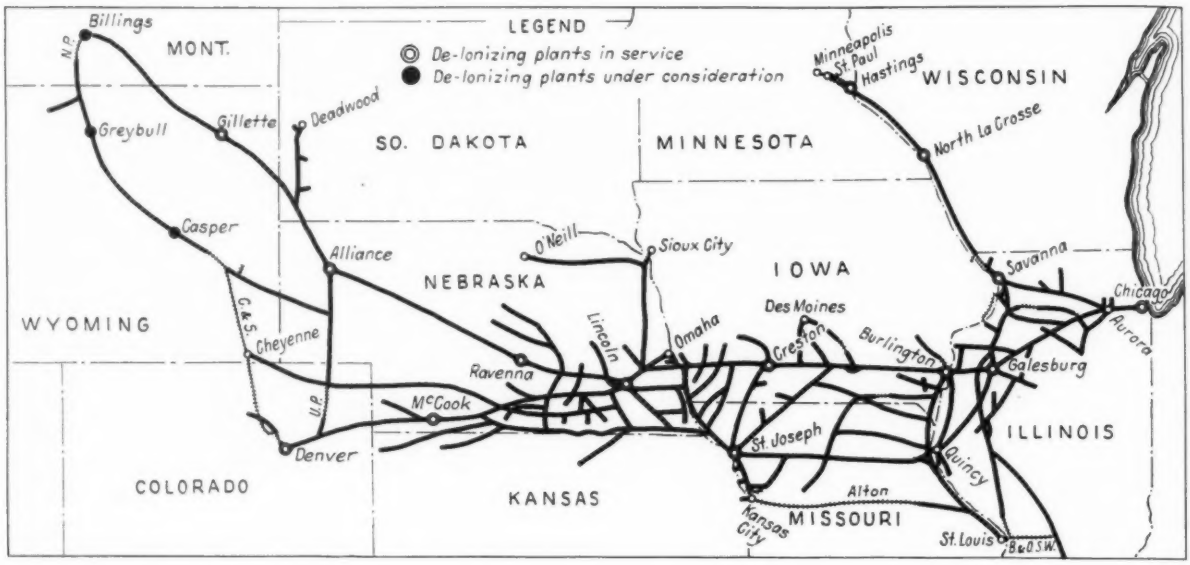
All of the work of rehabilitation is being carried out under the general direction of Col. J. P. Johnson, general manager of the road, and under the immediate supervision of R. A. Sharood, chief engineer. We are indebted for the accompanying photographs to Mr. Sharood, and to W. W. Hay, assistant professor of railway civil engineering, University of Illinois, who was the road's project engineer on it's bank-widening program last summer.

A tractor bulldozer, experimently equipped with a special blade for removing excess ballast from between the rails and for rough dressing of the shoulders

A bridge and building crew replacing a fir crib with a crib of treated piles in order to give the roadbed additional width along the steep canyon wall at this point

A section crew of native Indian women, with a white man foreman, working on the Alaska. While a normal working day on the track during the summer is either 9 or 10 hours, this crew works only 8 hours, as the endurance of the women is not as great as that of men. However, it is reported that this crew performs about as much work as does the average crew of men

A System Program for Diesel Water T



Map of the Chicago, Burlington & Quincy showing locations of de-ionizing plants

• The system-wide use of mineral-free water produced by the de-ionizing process is proving to be the solution of the water supply problem for steam generators on Diesel locomotives on the Chicago, Burlington & Quincy. The road initiated a program to install de-ionizing equipment on the Dieselized lines of the system in 1945 with the construction of four units. Since that time 10 more installations have been added, completing the program for those lines over which Diesel locomotives are operated at the present time. Since the use of de-ionized water on a system-wide basis has been in effect only about a year, definite statistics concerning the over-all results are not yet available. Failures of Diesel locomotive steam generators while in service, however, have been practically eliminated and maintenance costs of the units have been substantially reduced as a result of using de-ionized water.

For the first Diesel locomotives placed in service the Burlington used existing water supplies without special treatment. Because of the mineral content of this water, maintenance costs of the Diesels' steam generators were high and frequent failures were experienced. Therefore, the practice was started of using condensate from stationary boilers wherever possible. The volume of condensate available, however, was limited, and to furnish condensate for the increasing number of Diesels in service, it would have been necessary to install boilers that had no other purpose except to distill water. The cost of distilling water (four to five cents per gallon) was prohibitive, and the road, having decided from various studies to use, in Diesel steam generators, water equivalent to single-distilled water, investigated the possibilities of various water treatments that would produce such water at low cost. The treatment decided upon was the de-ionization process. This process produces water equivalent to single-distilled water (except for the very small amount of silica that is present) at a cost of approximately one cent per 1,000 gal. per grain of dissolved minerals removed.

De-Ionizing Process Explained

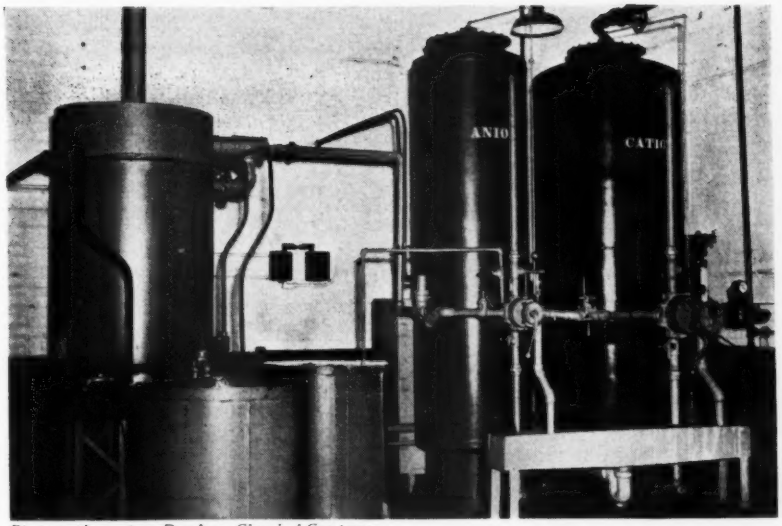
The de-ionizing process is based on the fact that most solids dissolved in water are in the form of positively and negatively-charged ions, which can be extracted from solution by contact with certain synthetic resins. The positively-charged ions are called cations and those negatively charged are known as anions.

A typical de-ionizing system is composed of three major units—a cation exchanger, an anion exchanger-adsorber, and a decarbonator. The water to be treated passes through each of these units in succession. The cation exchanger is a rubber-lined tank containing a synthetic resin which extracts from the water metallic cations held in solution, giving up in exchange positively-charged hydrogen ions. These ions combine with the anions dissolved in the water to form acids. The acid-bearing water then passes into the anion exchanger-adsorber, also a rubber-lined tank, where a different kind of synthetic resin extracts from solution the acids (except carbonic acid) released from the cation exchanger. The water, now containing only carbonic acid (plus any silica originally present), enters the decarbonator. In this tank, as the water percolates downward through a filtering medium, the carbonic acid breaks down into carbon dioxide and water, and the released carbon dioxide, scrubbed from the water by an up-flowing current of air, is vented with the air at the top of the decarbonator.

The water flowing from the decarbonator contains oxygen and residual traces of free carbon dioxide and may, therefore, have corrosive tendencies. These tendencies are neutralized by a finishing treatment designed to adjust the pH factor to

Treatment

As a result of studies of the Diesel water problem on the Chicago, Burlington & Quincy, based on the road's previous experiences with untreated water and boiler condensate, a program was set up to install de-ionizing equipment on all lines of the road on which Diesel locomotives are operated. With 14 such plants now in service the program has been completed for present Diesel operation and promising results are being obtained in reducing maintenance costs.



Photograph courtesy Dearborn Chemical Company

The de-ionizing plant at Denver, Colo., shown here, is located in the power house

any desired value, to eliminate harmful dissolved gases, and to provide any special reagents required.

The exchange of ions between the resins and the water is a reversible chemical reaction and when the resins become exhausted (i.e. have reached their capacity for exchanging ions), they can be regenerated by the use of commercial chemicals to restore their normal de-ionizing efficiency.

Locating the Plants

The Burlington has installed the de-ionizing equipment at points selected on the basis of operating considerations only, and the condition of the raw waters at these locations was not a factor in their selection. To keep the amount of water to be delivered to individual locomotives at the minimum and to eliminate the need of auxiliary tanks, the points of water treatment and supply were located about 150 to 160 mi. apart on the Dieselized lines.

The de-ionizing systems were "tailor made" to fit the conditions at each location. Factors determining the size of individual plants included the volume of treated water required, ranging from 10,000 to 50,000 gal. daily, and the amount of dissolved solids to be removed from the water. Also influencing the design were the sizes and pressures of supply water lines, the characteristics of power supplies and the housing or floor space available.

Over the Burlington system the nature of raw water supplies varies greatly, the water in the western states generally having the highest mineral content. As an example of a type of water for which a de-ionizing system was designed, and the results obtained by de-ionization, a complete analysis, in grains per gallon, of the supplies at Lincoln, Neb., is shown in the accompanying tabulation.

An important feature of a de-ionizing system is the relatively small space required for its installation. Advantage was taken of this feature

Analysis of Water at Lincoln, Neb. Before and After Treatment

(Grains per U. S. gallon)

	Raw (City wells)	De-Ionized (Before pH adjustment)
Silica	1.40	1.40
Iron & aluminum oxides	0.26	0.02
Calcium carbonate	6.98	0.06
Calcium sulphate	3.06	—
Magnesium carbonate	2.57	0.01
Sodium sulphate	3.85	0.11
Sodium chloride	1.50	Trace
Sodium nitrate	Trace	Trace
Sodium carbonate	—	0.13
Total hardness	12.2	less than 0.10
Total alkalinity	10.0	less than 0.20
Total dissolved solids	19.84	1.80
pH	7.8	5.5

on the Burlington by utilizing existing buildings for housing the systems wherever possible. The unit located at Chicago, for example, is housed in the basement of a service building; the facilities at Galesburg, Ill., and Lincoln are located in the basements of the passenger stations; the plant at Denver, Colo., occupies space in the powerhouse; and at each of two other points a stall in an existing roundhouse is utilized. At the other eight points, however, it was necessary to construct new buildings or additions to existing buildings.

Storage tanks have been installed at the location of each de-ionizing plant, which have sufficient capacity to carry through periods when the plant is closed down for regeneration. For the most part these are 12,000-gal. tanks from retired tank cars. The storage tanks are located outside the buildings which house the de-ionizing systems and are supported on concrete saddle foundations. They are protected against freezing weather, where necessary, by insulation and steam coils. The pipe lines from the storage tanks terminate in pits at the points where Diesel locomotives are watered. To the outlet in each pit is attached a length of 2½-in. fire hose, by means of which the water is delivered to the Diesel-locomotives.

The de-ionizing systems on the Burlington were constructed under the general direction of H. R. Clarke, chief engineer, and under the direct supervision of A. H. Simon, engineer of buildings, assisted by W. D. Gibson, engineer of water service. The tanks, piping, pumps and auxiliary equipment, from the inlet to the outlet of each system, were furnished by the manufacturer and were installed by Burlington forces. All necessary ion-exchange resins used in each system were also furnished by the manufacturer. The manufacturer also makes periodic inspections of these plants and does such servicing as is required. Regeneration of the plants is handled by regular employees of the Burlington who take the necessary time from their regular employment periodically to do this work.

Western Lines H

Railroads in a large area of the plains and Rocky Mountain states are still struggling with snow and ice conditions created by recurring blizzards that started with a storm on January 2. All available snow-fighting equipment was thrown into the work of clearing tracks of snow drifts that were so hard-packed that, in at least one instance, dynamite had to be used to break up the surface crust. This article gives a thumbnail sketch of the extent and severity of the storm conditions and their effect on the railroads, and the pictures give an idea of some of the snow conditions which taxed railroad snow-fighting forces and equipment to the limit.

Above—A rotary plow making its way through a deep cut filled to the brim with snow. Right—Bucking into a snow-filled cut with a wedge plow

• Mother Nature went berserk in January, hitting a large area in the plains and Rocky Mountain states with successive blizzards that were continuing to pile up snow even as this issue was going to press. The first of these, occurring on January 2, has been characterized by some veteran railroad snow fighters as the worst ever suffered. Whipped by winds of as much as 70 m.p.h., the snow was piled on railroad lines in drifts ranging up to 35 ft. in depth. More than this, one railroad man said there has "never been anything like it" from the standpoint of snow compactness, duration of the storm, and the territory affected.

Railroads hardest hit were the Chicago, Burlington & Quincy, the Chicago & Northwestern and the Union Pacific. Others affected to varying degrees included the Colorado & Southern, the Denver & Rio Grande Western, the Chicago, Milwaukee, St. Paul & Pacific, and the Chicago, Rock Island & Pacific. The Burlington's main line between Chicago and Denver, Colo., was out of service for some 36 hr. due to drifts up to 20 ft. in depth. Drifts up to 35 ft. deep on the line between Alliance, Neb., and Billings, Mont., tied up that line for more than a week. The Black Hills line in South Dakota was cleared on January 13, but was almost immediately plugged by another storm. Likewise, the line between Alliance and Brush, Colo., had to be cleared twice. At times the Burlington Lines was using five rotary plows and a number of wedge plows. Some branch lines of this road are still snowbound.

Eastbound transcontinental trains moving on the Union Pacific had to be held at Cheyenne, Wyo., following the storm of January 2, and did not begin to move again until January 6 when a detour route was set up. The westbound "City of San Francisco" was forced to stop at Kimball, Neb., where snow and high winds were so bad that passengers had to be led hand-in-hand by trainmen to a hotel.

The heavy snowfalls, the high winds, and the recurring nature of the storms caused railroad snow-fighting forces and equipment to be taxed to the limit. Rotary plows, wedge plows, spreaders, and crawler-mounted equipment (mainly bull-

The photographs reproduced on these two pages were furnished through the courtesy of the Chicago, Burlington & Quincy. They were taken on the St. Francis branch of the road in southern Nebraska and northwestern Kansas.

Hit by Worst Blizzards in History

dozers), were the principal weapons used in opening snowbound lines.

Typical of the conditions encountered were those on the Colorado & Southern between Ft. Collins, Colo., and Cheyenne. Drifts which were said to be almost as solid as concrete topped the rotary plows by five feet, and formed arches over the plows as they bored in. Dynamite was used to dislodge the top crust of the drifts.

Many Difficulties Encountered

Many difficulties and hardships were encountered in keeping lines open. Part of the trouble was due to the fact that in places considerable dust was mixed with the snow, making it heavier and more difficult to handle. Another problem was presented in narrow snow cuts where the side walls acquired a coating of ice due to alternate melting and freezing of the snow. To avoid difficulties and damage to equipment due to the narrow clearances and the hardened nature of the side walls, it was sometimes found necessary to widen these cuts, a process that proved difficult and expensive. The building up of ice between the rails also had to be contended with, which was done by operating snow plows and spreaders equipped with ice-cutting teeth.

Above—This cut has been opened and now the problem will be to keep it from closing again. Below—This rotary plow has a relatively easy task; some drifts were 35 ft. deep

Plans Take Shape for March Convention a

Events at Chicago will have special appeal due to unusual program commemorating the fiftieth anniversary of the A.R.E.A., and a record exhibit of the N.R.A.A. at the Coliseum

• The activities that will take place at Chicago during the week of March 14 will be something for engineering and maintenance officers to look forward to with keen anticipation. The keynote of the proceedings will be the fiftieth anniversary of the American Railway Engineering Association, which event will dominate the program of the association's convention to be held at the Palmer House on March 15-17. A concurrent affair will be an exhibit of the National Railway Appliances Association at the Coliseum, which, stimulated by the increased interest and attendance anticipated at the A.R.E.A. meeting, is expected to hit a new record in size and scope.

The program of the A.R.E.A. convention will deviate widely from usual practice, the purpose being to introduce special features commemorating the Association's Golden Anniversary. Through the holding of separate, concurrent sessions on Tuesday and Wednesday afternoons for receiving committee reports, additional time will be obtained for the presentation of special features.

Speakers at Opening Session

Speakers at the opening session on Tuesday morning, in addition to C. H. Mottier, president, A.R.E.A., will include Max Ruppert, president, N.R.A.A.; J. H. Aydelott, vice-president, Association of American Railroads; Ralph Budd, president, Burlington Lines; and H. T. Heald, president, Illinois Institute of Technology.

During the Wednesday morning session there will be addresses on "The Effect of Diesel Operation on Fixed Property of American Railroads," by J. B. Akers, chief engineer, Southern Railway System; on "The Investigation of the Relation Between Track and Equipment," by J. R. Jackson, mechanical engineer, Mechanical division, A.A.R.; and on "The Future of Soil Mechanics in Railroading," by Dr. R. B. Peck, research professor of soil mechanics, University of Illinois. Following these there will be a panel discussion on the subject, "How Can the Railroad Construction and Maintenance Engineer Best Meet Increasing Costs of Labor and Material? Participating in this discussion will be F. R. Layng, consulting engineer, Bessemer & Lake Erie; S. R. Hursh, assistant chief engineer — maintenance, Pennsylvania; and T. A. Blair, chief engineer system, Atchison, Topeka & Santa Fe.

On Thursday morning, G. M. Magee, research engineer, A.A.R., will discuss "The Future of Research on American Railroads"; and E. M. Hastings, chief engineer, Richmond, Fredericksburg & Potomac, will address the group on "The Future Opportunities of the A.R.E.A.

The addresses to be presented in conjunction with committee reports will include one on "Roadbed Solidification," by Rockwell Smith, roadway engineer, A.A.R.; one on "The Future of Timber Supply," by C. D. Turley, engineer of ties and treatment, Illinois Central; one on "The Future of Structural Engineering in Relation to Railroad Bridges," by Shortridge Hardesty, consulting engineer; one on "What We Know About Impact," by A. B. Chapman, assistant chief engineer, Chicago, Milwaukee, St. Paul & Pacific; one on "The Repair of Concrete Masonry," by A. N. Laird, chief engineer, Grand Trunk Western; one on "Recent Developments in Preservation Treatment," by Dr. Hermann von Schrenk, consulting timber engineer; one on "Recent Developments in Water Treatment," by R. C. Bardwell, superintendent water supply, Chesapeake & Ohio; and one by W. J. Hedley, assistant chief engineer, Wabash, on "Grade Crossing Protection."

Two evening sessions will be held. The principal feature of the Tuesday evening session will be an address on "The Achievements of the A.R.E.A.," by H. R. Clarke, chief engineer, Burlington Lines. The Golden Anniversary banquet will be held on Wednesday evening, and will be addressed by W. T. Faricy, president, Association of American Railroads.

One of the most unusual features of the week's events will be an extensive pictorial exhibit in the foyer of the Palmer House, depicting the progress of railway engineering during the last half century. This exhibit will consist of approximately 600 photographs and charts mounted in groups on panels 4 ft. square, which will be placed on easels and lighted for convenient inspection. The exhibit is being prepared jointly by the A.R.E.A. and the N.R.A.A., and is being financed by the latter association. In large part the photographs to be included in the display are being furnished by A.R.E.A. committees, by supply companies, and from the files of *Railway Engineering & Maintenance*.

At the time of going to press a total of 107 companies had arranged to occupy a total of 229 booths in the N.R.A.A. exhibit. These figures are already larger by far than for any previous exhibit of recent years, with indications that additional companies will sign up before the exhibit opens. Plans for the exhibit are being directed by Mr. Ruppert, P. & M. Company, as president of the N.R.A.A.; R. B. Fisher, Buda Company, as secretary of the association, and Lewis Thomas, Q & C Company, as assistant secretary and director of exhibits. Space is still available, and additional companies desiring to take part in the exhibit should apply to Mr. Thomas, 59 E. Van Buren street, Chicago. A list of the companies that have already arranged for space at the exhibit follows:

Exhibitors

Achuff Railway Supply Company, St. Louis, Mo.

Air Reduction Sales Company, New York.

Allied Chemical & Dye Corp., General Chemical Division, New York.

American Brake Shoe Company, Ramapo Ajax Division, Chicago.

American Fork & Hoe Co., Chicago.

and Exhibit

Seen here with one of the finished panels for the photographic exhibit are (left to right) J. de N. Macomb, chairman, Historical Committee, A.R.E.A.; C. H. Mottier, president, A.R.E.A.; Max K. Ruppert, president, N.R.A.A.; and George E. Johnson, representing Mr. Ruppert on the Historical Committee.

American Hoist & Derrick Co., St. Paul, Minn.
Armco Drainage & Metal Products, Inc., Middletown, Ohio.
Austin-Western Company, Aurora, Ill.
Barco Manufacturing Company, Chicago.
Bernuth, Lembcke Company, New York.
Binks Manufacturing Company, Chicago.
Bird & Son, Inc., East Walpole, Mass.
Buda Company, Harvey, Ill.
Butler Manufacturing Company, Kansas City, Mo.
Caterpillar Tractor Company, Peoria, Ill.
Chain Belt Company of Milwaukee, Milwaukee, Wis.
Chicago Pneumatic Tool Company, Chicago.
Chipman Chemical Company, Chicago.
Crerar, Adams & Co., Chicago.
Cullen-Friestedt Company, Chicago.
Dearborn Chemical Company, Chicago.
Henry Disston & Sons, Inc., Philadelphia, Pa.
Duff-Norton Manufacturing Company, Pittsburgh, Pa.
Eaton Manufacturing Company, Reliance Division, Massillon, Ohio.
Electric Tamper & Equipment Co., Ludington, Mich.
Encyclopaedia Britannica, Inc., Chicago.
Fabreeka Products Company, Boston, Mass.
Fairbanks, Morse & Co., Chicago.
Fairmont Railway Motors, Inc., Fairmont, Minn.
Frog, Switch & Mfg. Co., Carlisle, Pa.
G. & H. Rail Controls, Inc., Kansas City, Mo.
Gravely Ia-Nois, Inc., Davenport, Iowa.
Griswold Signal Company, Minneapolis, Minn.
Harco Corporation, Cleveland, Ohio
Harnischfeger Corporation, Milwaukee, Wis.
Hayes Track Appliance Company, Richmond, Ind.
Hilliard Corporation, Elmira, N.Y.
Hobart Brothers Company, Troy, Ohio
Homelite Corporation, Port Chester, N.Y.
Hubbard & Co., Pittsburgh, Pa.
Hyman-Michaels Company, Chicago.
Independent Pneumatic Tool Company, Chicago.
Industrial Brownhoist Corporation, Chicago.
Ingersoll-Rand Company, New York.
International Harvester Company, Chicago.
Johns-Manville Sales Corporation, New York.
O. F. Jordan Company, East Chicago, Ind.
Joyce-Cridland Company, Dayton, Ohio.
Kalamazoo Manufacturing Company, Kalamazoo, Mich.
Kay-Cee Manufacturing Company, Chicago.
Kershaw Company, Montgomery, Ala.
Koehring Company, Milwaukee, Wis.
Koppers Company, Pittsburgh, Pa.
Lehon Company, Chicago.
LeRoy Company, Chicago.
Locomotive Finished Material Company, Atchison, Kan.
Lufkin Rule Company, Saginaw, Mich.
Maintenance Equipment Company, Chicago.
Mall Tool Company, Chicago.
Master Builders Company, Cleveland, Ohio.
Matisa Equipment Corporation, Chicago.
Mid-West Forging & Manufacturing Co., Chicago.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Modern Railroads Publishing Company, Chicago.
Morrison Railway Supply Corporation, Buffalo, N.Y.
Murdock Manufacturing & Supply Co., Cincinnati, Ohio.
National Aluminate Corporation, Chicago.
National Lock Washer Company, Newark, N.J.
Nelson Stud Welding Division, Morton Gregory Corporation, Lorain, Ohio.
Nichols Engineering Company, Chicago.
Nordberg Manufacturing Company, Milwaukee, Wis.
Northwestern Motor Company, Eau Claire, Wis.
Oliver Iron & Steel Corp., Pittsburgh, Pa.
D. W. Onan & Sons, Inc., Minneapolis, Minn.
Oxweld Railroad Service Company, Unit of Union Carbide & Carbon Corp., Chicago.
P. & M. Co., Chicago.
Pettibone Mulliken Corporation, Chicago.
Power Ballaster Division, Pullman-Standard Car Manufacturing Company, Chicago.
Pyle National Company, Chicago.
Q. & C. Co., New York.
Racine Tool & Machine Co., Racine, Wis.
Rail Joint Company, Inc., New York.
Rails Company, New Haven, Conn.
Railroad Accessories Corporation, New York.
Railroad Products Company, Cincinnati, Ohio.
Railway Engineering and Maintenance, Chicago.
Railway Equipment & Publication Co., New York.
Railway Maintenance Corporation, Pittsburgh, Pa.
Railway Purchases and Stores, Chicago.
Railway Track-work Company, Philadelphia, Pa.
Reade Manufacturing Company, Jersey City, N.J.
Ric-Wil Company, Cleveland, Ohio.
Rust-Oleum Corporation, Evanston, Ill.
Skarnes Engineering & Supply Co., Minneapolis, Minn.
Sperry Products, Inc., Danbury, Conn.
Taylor-Colquitt Company, Spartanburg, S.C.
Teleweld, Inc., Chicago.
Templeton, Kenly & Co., Chicago.
Timber Engineering Company, Washington, D.C.
Unit Crane & Shovel Corp., Milwaukee, Wis.
United Laboratories, Inc., Cleveland, Ohio.
Warsop Power Tools, Philadelphia, Pa.
Western Railroad Supply Company, Chicago.
White Manufacturing Company, Elkhart, Ind.
Wisconsin Motor Corporation, Milwaukee, Wis.
Woodings-Verona Tool Works, Chicago.
Woolery Machine Company, Minneapolis, Minn.

Maintaining Curves With a String—

How to Stake t

Part VI of a Series

By W. H. LORD
Assistant Division Engineer
Nashville, Chattanooga & St. Louis
Chattanooga, Tenn.

Setting a tack in a stake with a specially designed gage, with a level bubble and a sliding pin

Feb. 1, 1949

Mr. ---------

The following throws will correct the alinement between Poles 143/16 and 143/27 on the north track:

Station		Throw West	Throw East	Station		Throw West	Throw East
E-O	2	-	-		22	4 1/2"	-
	3	1/4"	-		23	5"	-
	4	1 1/4"	-		24	4 1/2"	-
	5	3 1/2"	-		25	3 3/4"	-
	6	4 1/2"	-		26	4 1/2"	-
	7	4 1/2"	-		27	2 3/4"	-
	8	4"	-		28	-	-1/4"
	9	1/2"	-		29	-	-
	10	-	2 1/4"		30	-	3/4"
	11	-	4"		31	-	2 3/4"
	12	-	7 1/4"		32	-	2"
	13	-	10 1/2"		33	-	1 1/2"
	14	-	11"		34	-	1 1/2"
	15	-	11"		35	-	2"
	16	-	8 1/2"		36	-	1 1/2"
	17	-	7 1/2"		37	-	1/4"
	18	-	5 3/4"		38	3/4"	-
	19	-	2 3/4"		39	1/4"	-
E-O	19½	Reverse point		E-O	40	-	-
	20	-	1/4"				
	21	2 1/4"					

Note that the reverse point is now half way between Stations 19 and 20. The north spiral will be 255 ft. long or 1/2 in. in 25½ ft. The north curve will be 6½ deg. with 5 in. elevation. The spirals on each side of the reverse will be 225 ft. long or ⅜ in. in 22½ ft. The south curve will be 6 deg. with 5 in. elevation. The south spiral will be 295 ft. long or 1/2 in. in 29½ ft.

Markers and tacks herewith; you can obtain stakes from stock. Please advise me when the track has been lined to these stakes.

Yours truly,

Division Engineer

Where the calculations have been made by the engineering department, a letter of instructions, like the above, giving the throw at each station in inches and quarters, will make it possible for the supervisor or foreman to reline the curve readily

THE half-throws in the final column of the computations represent the number of units (eighths of inches, usually) in one-half the throw necessary at each station. Obviously the full throw is the same number of units twice as large (quarter inches) and, if a measuring rule has been prepared as described heretofore,* these throw figures will represent the number of such divisions on the rule that the tacks are to be placed off center of the existing track—if positive, toward the high, or outer, rail, and in the opposite direction if a minus throw is indicated. If the stakes are to be set by trackmen or supervisors, it is necessary to change the figures to inches and quarters, by dividing the figures shown in the half-throw column by four, i.e., a half-throw of 18 will be changed to read 4½ in. A list of the throws, with positive and negative values in separate columns, for the various stations, should also be furnished to the man in the field who is to set the stakes.

When the curve correction calculations are made by a representative of the division engineer's office, a simple letter of instructions (as shown in one of the accompanying illustrations), giving the throws, in or out, for each station, in inches and quarters, enables the supervisor or foreman to reline the curve with a few simple measurements.

Setting the Stakes

There are two methods in use for setting the stakes. One of these is by setting them on the revised center line of the track, and the other is by setting them at some fixed distance from the proposed location of the high rail, either inside or outside of it, using the gage side of the head of the rail or the base of the rail for

*See Part I, September, 1948, issue, page 918.

the Revised Curve

In this, the concluding installment of this series of articles, the author presents detailed instructions for the staking out of the revised curve as calculated by the string-lining method, with several suggestions for setting of the stakes and tacks, and for rechecking the stake positions to be sure that no change in the curve alinement has occurred since the original ordinates were measured. He also discusses correcting of the records, and ends with the admonition that the computer can well afford to spend several hours in studying the solution of difficult curves, trying time after time, if necessary, to make such slight alterations in his solution as will bring about the best possible results.

measurements. In the latter method the stake is set usually at such a distance that when the part of the rail used is lined to 12 in. from the tack, the rail, and with it the center of the track, will be in the revised curve. Either method can be used, but as trackmen usually prefer to bring the scribed center mark on the track gage over the tack, probably 90 per cent of the stakes are set in the revised center line. Therefore, this method will be the one described here.

It is not always necessary to use stakes at all. On some roads in multiple-track territory, measurements from adjacent tracks at every station are recorded at the time the ordinates are measured. These measurements are added to or reduced by the amount of the throws and the corrected figures are used to line the track instead of stakes. Just how these measurements are recorded and used to aline the track to the corrected curve varies on different railroads. The method used on at least one road is to record the track-to-track measurements on the ties of an adjacent track, directly opposite each string-line station, by scribing a mark with a simple device known as a "scratch board" (see accompanying sketch), and then setting a tack in or out from this mark as indicated by the half-throw column. The scratch board is then used subsequently when the track is lined to its new location.

Setting the Tacks

If the string-lining tool is used to set the tacks (and it should be used on all curves where the speed is high), the instructions for using it should be followed by competent men, and the hole for the tack in the head of the stake should be made with this tool. For slower speeds, the measuring rule, heretofore described, is used by the writer, using the markings which begin one-half gage from the end.

A tack is first set lightly in the edge of the tie nearest the station where the ordinate was measured, measuring out horizontally from the bottom of the curve-worn portion of the head of the rail and plumbing down to the tie. The stake is driven in the space next to the tack, in line with it so that the tack will be driven in the head when it is measured from the rail.

One of the men measures carefully with a short stick from the web of the rail to the tack in the tie, then, holding this measurement with his thumb nail, he sets a tack in the top of the stake and checks again with the tack in the tie. When he is sure that the tack in the stake is correct, he drives it in and then pulls out the tack in the tie. The use of a rule in setting the stake tack, instead of a short stick, is not recommended, as the user will try to remember the measurement, instead of holding his thumb nail on it, and will make errors which, while almost impossible to catch, will affect the line soon after traffic starts. In rock ballast it is best to open up a hole for the stake with an iron pin, but in gravel or cinders the stake can be driven without any aid.

Work Should Be Checked

In the meantime, the man setting the tacks in the ties, who can work much faster than the stakes can be driven, may finish doing so and can go about other work, possibly measuring up the next curve ahead. However, he should return and look over the work, checking from his list at any stake which may appear to be out of line. In fact, it is good practice to check every stake unless the men are very familiar with what they are doing and are known to be careful.

If any stake appears to be out of line, yet the measurement from the rail is correct, it is quite likely that the track has moved at this point since the original ordinate was taken, and the tack should be checked with a string, two stations long, and the middle ordinate for the stake in question measured. This measurement should be the same as the revised ordinate for that station. If it is not, and the adjacent stakes check out closely, that stake should be set over to the correct measurement from the string, until all stakes are in a true line. It is a good plan for the trackman, or his supervisor, to check over the stakes again in this manner while the track work is in progress to be sure that no stake has been shifted and that all ordinates

Setting the tack in a stake on the revised center line, plumbing down with a pencil

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are uniform when the final lining has been completed.

As soon as the track has been lined, the computer should be notified so that he can change, or have someone else change, the office records for the curve. He should report the location; track (if in multiple-track territory); the distance from mile post or valuation station

Sketch of a scratch board used to record track-to-track measurements on the ties of an adjacent track by scribing a mark on a tie opposite each string-line station. The tack is then set in the tie, in or out from this mark, as indicated by the half-throws

marker to the beginning of the spiral; the length of the spirals; and the length, elevation of the outer rail, and the degree of the circular curve. All of this, except the degree of curve, is in his recorded notes. To find the degree of curve, if stations of other than 31 ft. in length were used in the measurements and computations, it is necessary to provide a table for each unit of middle ordinate and for each length of stations used.

Three such tables, based on ⅛-in. ordinate measurements, and on 39-ft., 37-ft., and 33-ft. stations, respectively, were presented in Part III of this series of articles, in the November, 1948 issue, page 1157.

Computing Degree of Curve

The construction of such a table is very simple. Twice the radius of the outer rail is equal (very closely) to the square of the station length divided by the ordinate (in decimal fraction of a foot, of course). In other words, the radius of the outer rail is equal to the quotient of the square of the station length divided by twice the ordinate, in feet. The radius of the center line will be one-half gage less than the above, and this correction is necessary for curves over four degrees. The nearest degree of curve is taken from a table of radii.

The sum of all the units, omitting the spirals, of course, divided by the number of ordinates, gives the average value of ordinate, which should be used to determine the degree of curve from the tables. For example, an average of 52.2 units would indicate a 4-deg. 7-min. curve if 39-ft. stations were used; a 4-deg. 35-min. curve if 37-ft. stations; and a 5-deg. 45-min. curve if 33-ft. stations were used. For 31-ft. stations, an average ordinate of 52.2 units equals 6.525 in., or a 6-deg. 31.5-min. curve.

If other lengths of stations, or units of measurement other than eighths of inches, are to be used, tables for each should be prepared.

For keeping the office records of the curves, the writer prefers using a card system, one card for each curve on each track, filed in consecutive order by mile posts or valuation stations, as other track records are kept. In multiple track territory, the data for curves in each track will be different usually because of different speed or direction of grade which will call for varying lengths of spirals and different elevations of curve. Also, on sharp curves over which streamlined trains operate, the centers between tracks have to be made wider, which is generally accomplished by using different degrees of curve for each track. These are the reasons for a card for each track.

To check the central angle of a curve, as shown by previous records, with the notes taken on the ground, the total sum of all ordinates, including the spirals, multiplied by 19.1, is divided by the product of the chord length multiplied by the number of units per inch used (as 8 or 16). The quotient will be equal to the central angle in degrees closely enough to detect any serious errors. It will not agree exactly because the ordinates were taken to the nearest unit, but the more carefully the ordinates were measured, the more closely it will agree. A discrepancy of as much as one per cent would indicate one or more serious errors in reading the original ordinates, and they should be rechecked in the field.

General Remarks

The re-centering of an existing curve with a transit often causes it to be compounded slightly to avoid too much throw or to clear obstructions which may have been erected without first correcting the alinement. String-lining, however, being an averaging method, tends to make uniform as many of the ordinates as possible, and to reproduce as nearly as practicable the original alinement of the curve. Each time the curve is relined by the string-lining method the sharper portions of the curve are slightly flattened and the lighter portions sharpened, within the limitations of throws and obstacles, to approach uniformity.

The writer recalls one curve which was staked by transit and made a four-centered compound curve ranging from 3 deg. 12 min. to 5 deg. 10 min. It is in the northbound track and reverses into curves of about the same degree at each end. It has been stringlined three times in the last seven years, each time improving the alinement slightly without exceeding the 12-in. permissible throw. Any throw in excess of 12 in. would have encroached on the clearance from the southbound track or on the clearance from a high stone retaining wall along several hundred feet on the east side. This curve is now within a two-foot throw of being a perfect single 4-deg. 6-min. curve with proper spirals. It can be made a perfect curve, but the southbound track must be moved before this can be done. It was probably a 4-deg. curve, reversing on a point at each end, without spirals, when it was built in the 1850's. It is still a four-centered curve, but the degree only varies from 4 deg. 2 min. to 4 deg. 20 min. In time this will become nearly perfect and uniform.

Seek Best Possible Results

The computer can well afford to spend several hours in studying such curves, trying time after time to make such slight alterations to his solution as will bring about the best possible results. It is obvious that the best results could never be obtained by the use of a transit in rough terrain where intersection of the tangents is not possible and the moving of fixed obstacles is impracticable or too expensive.

Every effort must be made to obtain spirals of suitable length, to make the body of the curve as uniform as may be possible, and to keep the degree of curve at a minimum, while keeping the throws inside the maximum limit—to clear all fixed obstructions and to pass over the centers of bridges and through all other fixed locations.

No curve should be staked until the computer is satisfied that he has obtained the best possible solution and that it meets the above requirements at every station. Needless to state, this requires patience and perseverance, as each curve is a problem by itself and can be solved only by repeated trial and correction. The work, however, is very fascinating, and the computer has a feeling of real satisfaction with the solution of each problem.

A major operation changed the Pennsylvania's gloomy, 56-year-old station at Salem into the attractive structure shown here

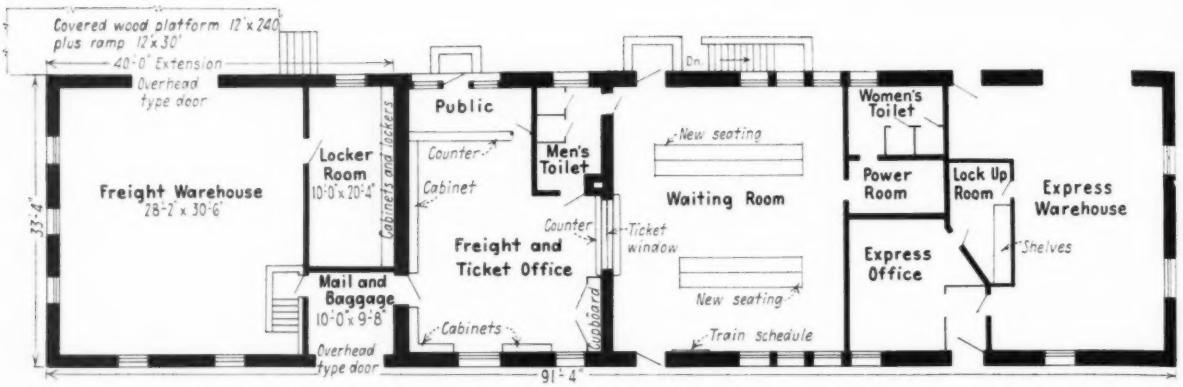
Small Station Is Brought Up to Date

This article describes the recent modernization of the Pennsylvania's passenger station at Salem, Ohio, which now offers a most attractive appearance compared with the dark and unsightly look it presented in the past. The improved appearance was obtained by cleaning the stone exterior, recasting the roof lines, and, on the interior, by incorporating modern finishing materials and fluorescent lighting. Also, the article tells how the road consolidated all of its freight activities at Salem in the passenger station.

Patrons of the remodeled Salem passenger station are pleased with the cheerful appearance of its modernized interior

• As the result of a complete modernization project, in which the structure was enlarged to accommodate all freighthouse activities, the Pennsylvania has converted its gloomy 56-year-old passenger station at Salem, Ohio, into a neat and attractive structure that has been widely acclaimed by the townspeople. The exterior of the station, which is of stone, was cleaned and roof overhangs were cut back to give it a trim fresh appearance, while the interior was brightened through the use of modern floor, wall and ceiling materials replacing the dark wood and paint finish of its earlier days. Illumination of the interior was improved through the effective use of fluorescent lighting instead of the ornate, but ineffective, chandeliers of the original construction.

The modernization work was also carried into the office areas of the building, not only providing more cheerful working conditions for employees, but also providing pleasant and up-to-date surroundings for the road's freight customers who call there to transact business. The entire



Floor plan of the remodeled and enlarged structure

project was carried out by company forces.

The station at Salem—a stone structure, 31 ft. by 91 ft. in plan—was completed in 1892. Following closely the style of that era, it was characterized by a high gabled roof which overhung the ends and rear of the building by six feet. The overhang on the south, or track, side of the structure was much wider—19 ft.—and almost covered the entire width of the platform between the station and the westward track. At each end of the building this platform overhang was joined by umbrella-type shelter, 20 ft. wide and 27 ft. long. The combined length of shelter along the westward platform was 145 ft.

As originally built, the interior of the station was arranged to provide a general waiting room, 29 ft. by 46 ft., near the center of the building, with a women's waiting room, 16 ft. by 18 ft., in the northeast corner. Directly south of the women's waiting room and east of the main waiting room was the ticket office, while the women's toilet room occupied the southeast corner of the building.

At the west end of the main waiting room was the men's toilet room and a telegraph office. The remainder of the west end of the building, 14 ft. by 29 ft., was used as a baggage room.

Earlier Remodeling

This arrangement remained in effect for a number of years, during which all freight-station activities were carried on in a separate building about 350 ft. west of the passenger station. However, a number of years ago, when it became apparent that the waiting-room area in the passenger station could be reduced in size without interfering with the comfort of patrons, it was decided to remodel the interior of the building to provide warehouse and office space for the Railway Express Agency, formerly located in a separate building, and for the freight office.

In these earlier changes, which were largely confined to the station interior, the waiting room was reduced in size to 27 ft. by 29 ft. by erecting a wall to form a new east end of the room. The entire area east of this wall, 20 ft. by 36 ft., was then divided into smaller rooms and turned over to the Express Agency, except for an area 8 ft. by 11 ft., which became the women's toilet room.

The ticket office was relocated into the former telegraph office, while the baggage room at the west end of the station was divided into two rooms, each approximately 14 ft. by 14 ft., one of which, on the north side of the building, became the freight office, while the room on the south, or track, side remained as the baggage room.

The earlier remodeling had little effect on the appearance of the station interior, which, by today's standards, however, was dark and unattractive with dark wood floors, paneled wainscoting and dark wood ceilings above buff colored plaster walls. Lighting was by means of ornate chandeliers, which were later replaced by shaded droplights. The exterior was unchanged in this earlier work and the roof overhangs, particularly that on the track side, continued to give a somewhat top-heavy appearance to the structure.

In recent years, the freighthouse, which was built in 1862, began to require an increasing amount of attention to keep it serviceable. Recognizing that its economical service life had passed, the Pennsylvania decided to retire this building and to consolidate all freighthouse operations in the passenger station.

The principal exterior change was the construction of a 40-ft. extension at the west end of the station to accommodate the freight warehouse. Other exterior work included the removal of the roof overhang on the ends and rear of the building, the cutting-back of the wide overhang on the track side from 19 ft. to 6 ft., and the removal of a gable on the east end. A butterfly-type platform shelter, 9 ft. wide and 175 ft. long, was built in front of the station, between it and the westward track.

The building extension is constructed of tile, faced with a four-inch stone veneer, and is supported on a concrete foundation. Its interior is arranged in three rooms: a warehouse 28 ft. by 29 ft. across the west end, a lock-up room for valuables, 10 ft. by 19 ft., and a small baggage room, 10 ft. by 10 ft.—the latter two rooms being located on the east side, adjacent to the older part of the building. The floor of the baggage room is at the same level as that of the older section of the building but that of the warehouse and lock-up room is 3 ft. 6 in. higher and is laid on a fill of granulated slag.

Stone for the exterior of the extension was quarried locally and matches closely that used in the earlier construction. The roof of the new section is shingled to match that of the older structure. Overhead-type doors are provided in the north wall of the warehouse and in the south wall of the baggage room.

A timber platform, 12 ft. wide, on concrete footings, extends along the north side of the extension and continues west, beyond the limits of the building, for a distance of 204 ft. This is covered throughout its length by an umbrella-type shelter. The house track is located directly south of the platform and is stubbed at the west end of the building. This phase of the work involved shifting 440 ft. of existing track and the construction of 155 ft. of new track.

The general arrangement of the older part of the station was un-

changed. However, both toilet rooms were enlarged, and the walls separating the ticket office, the old freight office and the old baggage room were removed to convert this entire area into a large open office in which all clerical work is now performed.

New Interior Finishes

The most striking change has been in the decoration of the waiting room, toilet rooms and the consolidated office. The old wood flooring was removed and was replaced by asphalt tile flooring over a plywood sub-floor—the tile being laid in a checkerboard pattern with nine-inch squares of mottled grey and black.

The walls of these rooms are finished in three colors of enamel-like, scratch-resistant wallboard. The color scheme is dark blue to a height of four feet above the floor, with a cream color above—these areas being separated by a narrow strip of black. The joints between adjoining panels are covered with strips of stainless-steel molding.

The old wood ceilings in these rooms were removed and were replaced by suspended acoustical ceiling, hung on wires from the rafters. The ceilings were lowered 3 ft. below the original ceiling level to a new height of 13 ft. above the floor.

Ticket Window

A new wide ticket window is located in the west wall of the waiting room, replacing a former narrow grill-work window. The window is a single pane of plate glass, with two openings just above the deal plate for the exchange of money and tickets. Two speaker holes, five inches in diameter, are also provided in the glass to facilitate conversation between patrons and the ticket agent. The word "Tickets", in raised wood letters six inches high, appears directly above the window.

As already mentioned, the toilet rooms were enlarged as part of the modernization. In the case of the women's room, this increased area provided sufficient room for a powder room, suitably furnished with vanity, and a comfortable sofa, while in the men's room it was used for additional fixtures. The decoration of these rooms follows the color scheme of the waiting room. Completely new fixtures were installed in both rooms.

Other features which add to the appearance of the waiting room include flush-type doors leading to the toilet rooms, with the words "Men" and "Women" in raised block letters mounted on the proper doors. Another attractive feature is the train bulletin board, which is mounted on a stand just inside the door leading to the track platform. This involves the customary blackboard, with train numbers and symbols neatly painted thereon, the board being framed in a heavy oak frame with a clear finish. The frame serves also to conceal fluorescent lights which illuminate the board. The words "Train Schedule" appear in cut-out letters above the frame. New wood benches were constructed for the waiting room. These are of a more comfortable design than those they replace and are stained light oak.

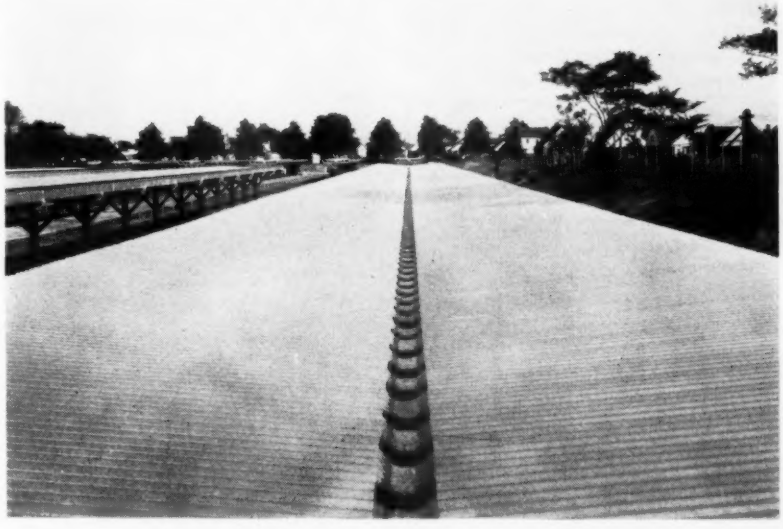
Glass Blocks Used Extensively

Glass blocks were used extensively in both the old and the new sections of the station. In the old section these blocks are arranged in panels above each of the windows and doors. They are also used to frame a new doorway in the north wall of the station leading into the office. In the new section, glass blocks were used to form small windows with sections of pivoted sash for ventilating purposes.

The office is finished in the same manner as the waiting room. It is fitted with numerous plywood cabinets, stained light oak, for keeping records, tariff files, etc. Just inside the doorway to the office, is a long counter, at which those calling at the station with regard to freight matters may transact their business. Beneath the counter are cabinets for additional storage.

Fluorescent lighting fixtures were installed in all of the public rooms of the station and in the office. These are of the flush type and are recessed into the ceiling. In the waiting room the fixtures are arranged in two continuous rows, while in the office area they are spaced to concentrate light on the desks and at other locations where most needed.

As the final step in the project, the stone exterior of the old building was thoroughly cleaned to give a fresh, new appearance.



Aluminum for Box Gutters and Roofing

***SHOWN** here is one of ten butterfly-type platform shelters at the Belmont Race Track station of the Long Island, each of which contains a built-in box-type longitudinal gutter, lined with embossed-aluminum built-up roofing, 0.004 in. thick, developed by Reynolds Metals Company, Louisville, Ky.*

The wood framework of the gutters was first covered with one layer of 30-lb. asphalt-saturated felt, after which a starter strip, 18 in. wide was hot-mopped into the felt at the lower end of the gutters. Succeeding courses of the embossed aluminum, 36 in wide, were lapped 18 in. to give two-ply coverage. Each course was mopped in, the mopping being extended 4 in. to 6 in. beyond the edge of the sheet. This method of installation eliminated the need for soldered cross seams or expansion joints.

A total of 2,200 lin. ft. of guttering was installed at this location, after which the roof surfaces of the shelters were covered with Reynolds corrugated aluminum in sheets 8 ft. long, 35 in. wide and 0.032 in. thick.

Off-Track Machines on the Job

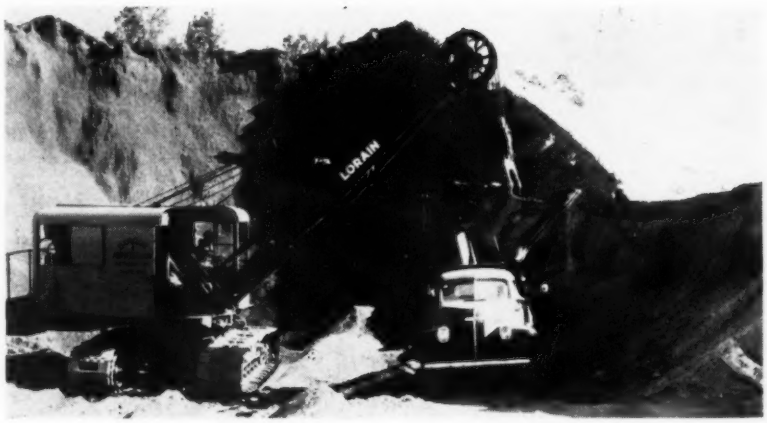
Hardly a day passes without some new evidence of the many applications of off-track material-handling and earth-moving equipment in the maintenance-of-way field. During the last several weeks an unusual number of photographs depicting the use of such equipment has come to our attention. From these we have selected the three appearing on this page. These emphasize the many types and uses of off-track units.—Editor.

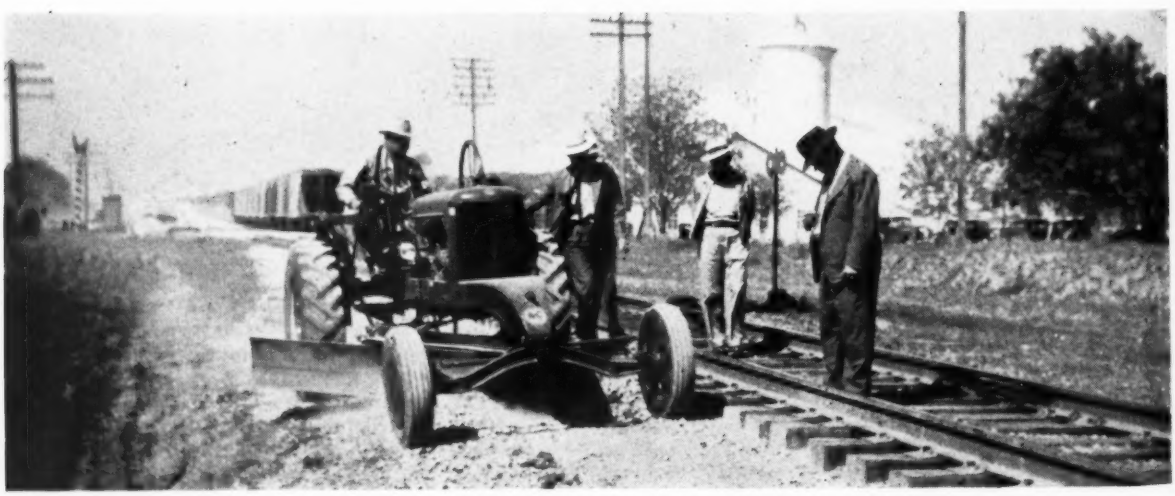
Materials Handling

IN THE view at the left is shown a Caterpillar D6 tractor with Hystaway attachment, handling switch timbers in a yard on the Waterloo, Cedar Falls & Northern. This machine is also used for loading telephone poles, and for many other similar tasks.

Stepping Up Ballast Output

THE Bangor & Aroostook recently replaced a 2½-yd. railroad-type steam shovel with a new 2-yd. Lorain-820 shovel which is shown here loading gravel ballast. The railroad reports that the use of the new shovel has resulted in a substantial saving in labor at the gravel pit. Furthermore, because of its maneuverability, the shovel is reported to have eliminated the need of wasting considerable material by train when pockets are encountered in the ballast pits. The machine is said to have handled a daily average of 2,400 cu. yd. of material, working against a 20-ft. to 60-ft. bank.





Cutting a Shoulder Down

A NEW use for Allis-Chalmers W-Speed Patrol graders has been found on the Missouri Pacific. Five miles south of New Braunfels, Tex., these machines were used to level sun-hardened mud heaves along the shoulder of the roadbed in order to simplify the work of changing out crossties. In the same operation the forward end of the blade was used to cut the ballast from the ends of the ties. It is reported that the mud heaves were reduced in five or six passes of the machines.

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems

Checking Riding Quality of Track

In checking the riding quality of his track, should the supervisor or roadmaster ride the rear end of conventional equipment, the fastest streamliners, or both? To what extent should he ride locomotives—steam and Diesel? Explain.

Compare Rides on Each

By MALCOLM E. CONDON
Track Supervisor, Erie, North Newark, N. J.

To be able to ride over his territory on equipment and at speeds adequate to locate poor-riding track correctly is a definite asset and materially assists a supervisor in detecting such conditions at their inception and in permitting prompt corrective action.

Unfortunately not all equipment, even of the same type and series, rides the same. Some passenger coaches will ride quite smoothly over track which seemed rough on others. This also applies to gas-electric power units, on which a ride on the motor end will be fairly good, but from the opposite end will indicate the rough spots readily. Pullman equipment, for the most part, rides well, and any bad spots felt are almost without exception very bad and need to be corrected immediately. Cabooses vary considerably in their riding qualities, and, coupled with slack action, line spots, etc., will give many false indications.

Diesel locomotives ride so smoothly by reason of the rigid frames, excellent spring action, and equalized weight distribution, that it is difficult to detect any except very bad line or surface spots. On the other hand, steam locomotives, with very few exceptions, ride so poorly that only the seasoned locomotive engineer can interpret the lurches, bumps, etc., due to track conditions, with any degree of accuracy.

Relative speeds of the trains used during the inspection periods are very important, as a variation of as little as 10 m.p.h. may give an entirely different effect. This is particularly true where successions of low joints cause side sway, as the combination of speed, distance between truck centers, spring action and rail joint spacing may be such as to cause an excessive amount of side sway, or, with a variation in speed, tend to equalize each other and cause the equipment to ride quite smoothly.

In summary, the various types of equipment, both freight and passenger, the different classes of trains, and the varying operating speeds, all produce different riding effects and require proper interpretation to differentiate between serious conditions necessitating immediate correction, and conditions of lesser importance which can be programmed for correction. Frequent checking of all questionable spots under varying conditions of speed on different trains will soon indicate the true aspect at each location. This phase of track inspection is particularly important during the winter when heaved-track conditions are prevalent.

Ride The Fastest Trains

By J. H. GIBBS
Roadmaster, Missouri Pacific, Arkansas City, Kans.

In my opinion a roadmaster or supervisor should ride the rear ends of the fastest trains on his territory when checking his track for riding conditions. He should have a place

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Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 105 W. Adams St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In The April Issue

1. What are the advantages of equipping track gangs with portable telephones? Are there disadvantages? How can such telephones be used most effectively?

2. To what extent should exterior millwork, such as window frames and sash, be given preservative treatment before being used in the repair or construction of buildings? What types of treatment are best adapted? If used, where should this treatment be given? Explain.

3. In ironing or doweling ties, when should the work be done, before, during, or after seasoning? What factors are involved? Explain.

4. What species of wood, when treated, are effective for use as piles in dolphins and pile clusters protecting bridges, wharves, ferry slips, etc.? What characteristics are desirable for such piles? Explain.

5. Should weed control on the right-of-way (outside of the track area) be handled by contract or by company forces? Why? To what extent have new methods and equipment affected this situation?

6. What problems are involved in satisfactorily disposing of the sludge from lime—soda ash water softeners, and the effluent from the regeneration of zeolite and demineralizing plants? How are these problems best solved? Explain.

7. What types of low-level platforms are best suited for use at small passenger stations, from the standpoints of cost of installation, economy of maintenance and satisfactory service? Explain.

to sit down if possible, for when sitting he gets the sway from every low or out-of-line spot as well as the bumps at low joints, road crossings, switches or bridge ends. If he stands, his body sways more or less with the train and he will not feel some spots that are quite noticeable when sitting down. Riding locomotives occasionally is good practice and is helpful, but if on a high-speed railroad one feels a rough spot as he passes over it, he is not in a position to give his foreman an accurate mile-post or telegraph-pole location, or to say whether it was something usual or unusual. Line, surface, and gage are the secrets of a smooth-riding, high-speed railroad, and most men do not coordinate the details of them all when riding locomotives, slow trains or motor cars. Personally, I think every roadmaster or supervisor should ride the rear ends of the fastest trains on his territory if he wants to maintain good track as well as a good appearance of it.

Ride All Classes of Equipment

By L. C. BLANCHARD
Roadmaster, Chicago, Milwaukee, St. Paul & Pacific, Mitchell, S. D.

Roadmasters should ride all classes of equipment, including sleepers, day coaches, baggage cars, cabooses, and both steam and Diesel locomotives. We sell transportation, and to hold patrons we must give them a comfortable ride in both sleeping cars and day coaches. The way to test the riding quality of these cars is to ride them. Also, by riding the rear of these cars, bad line and gage can be detected and spotted for correction.

Baggage and express cars are frequently bad riders. They cause damage to the lading and fatigue to the employees. Roadmasters can assist in picking out these cars, and through constructive criticism be of service in having their riding quality improved.

Because of its short wheelbase, a caboose at the rear of a fast freight train is an ideal spot from which to check the track as well as to observe the riding of the cars. One can pick out the chuck holes and out-of-level spots that give the tip-off to dangerous places in need of prompt correction.

Roadmasters should ride all classes of power. Generally, locomotives are more detrimental to the track than other classes of equipment and, too, each unit has is own riding characteristics. These should be studied as to their effect on the track, and also in order to be able to call the attention of the mechanical department to the bad riders. Often an improvement can be made in the springing. All locomotives are affected by bad alinement of the track and there is no better vantage point from which to study that alinement and its effect than from a locomotive cab, whether it be steam or Diesel.

Ride Every Week—At Least

By J. F. McCOOK
Division Engineer, New York Central, Chicago

It is the practice on our division for a supervisor of track or one of his assistant supervisors to ride the rear end of conventional equipment at least once a week during the greater part of the year, and twice a week during the winter.

At the rear end, of course, with no car behind to steady it somewhat, more rough spots in the track are disclosed than at some location near the middle of the train. When two or more are riding for inspection purposes we occasionally have one man ride in a coach near the middle of the train, and a comparison of notes is made at the end of the trip. This method helps to place the emphasis on the spots in the track which need preferred attention.

In order to appreciate the riding quality of the track from the point of view of the engine crew, a supervisor rides the locomotives of conventional equipment and fast streamliners about once every two weeks. Friendly associations and discussions with engine crews pay dividends for any supervisors. Rough spots which occasionally develop quickly are reported at the nearest station by engine crews, and this information is relayed quickly to the supervisor for immediate attention.

Riding in Diesel engines, because of the greatly increased visibility, affords a supervisor an opportunity to observe more satisfactorily the progress of track programs and the conditions of track and right-of-way. He can look ahead and see things more advantageously than is possible from the rear end of a train moving at a speed of 80 m.p.h.

Usually the division engineer and his assistant ride the rear ends of the fastest streamliners. The middle cars of these streamliners are also ridden in order to provide a comparison similar to that in conventional equipment, as indicated above.

Installing Temporary Crossovers

In double or multiple-track territory where conditions permit killing one track to allow major track maintenance operations without the interference of traffic, is it feasible to install temporary crossovers at intervals to facilitate the detouring of trains? If so, should crossover ties be left in track after work in a specific territory has been completed? Explain.

Timbers Curl If Left In

By G. A. PHILLIPS
Chief Engineer, Delaware, Lackawanna & Western, Hoboken, N. J.

It is feasible to install temporary crossovers at intervals to facilitate the detouring of trains, and the ties in these crossovers can be left in after the track work in a specific territory has been completed. We have found, however, that after the timbers have been in track for a period of about five years there is some "curling up" of their ends on which no weight is imposed. This "curling up" has necessitated our adzing these ties at some points up to two inches to facilitate the reinstallation of the crossovers.

When one considers the amount of track—often 3,000 to 5,000 ft., depending on the force of men and machines utilized—that can be tamped in one day by the detour method, it would seem very desirable to install temporary crossovers not less than 10 mi. apart.

Crossovers Minimize Delays

By H. F. FIFIELD
Engineer M. of W., Boston & Maine, Boston, Mass.

In connection with major track maintenance operations such as resurfacing and laying rail, the operat-

ing department is usually willing to permit single-track operation provided the single-track sections are kept to a reasonable length—between three and five miles—thus minimizing train delays account of detouring. On our railroad we usually have permanent trailing crossovers at about this distance apart, and it only becomes necessary to install facing-point crossovers to permit detouring on either track. It is very important that our operations be conducted with minimum delay to traffic. This can only be accomplished by reducing detour lengths.

The question of leaving the crossover ties in track after work in a specific territory has been completed depends largely on the program work necessary in that section. If the track is to have new rail, and later is to be resurfaced out-of-face, temporary crossovers are installed first to take care of the rail job. Then the crossover ties are left in for the reinstallation of the crossovers when the track is resurfaced, after which the switch timber is removed and crossties reinstalled.

Railway Uses of Wetting Agents

What are wetting agents? For what railway purposes are they adapted? How effective are they? Explain.

They Improve Wash Water

By G. E. MARTIN
Superintendent of Water Service, Illinois Central, Chicago

Wetting agents are substances which are added to surface coatings to increase spreading and penetrating action. In general, wetting agents are made up of more or less complicated molecules composed of two essential parts. One part is termed *hydrophilic* and is the portion that draws the agent into water; the other part of the molecule is termed *hydrophobic* and tends to leave water and attach itself to, or dissolve in, an oil or other non-polar medium. Among the properties of wetting agents is their ability to lower surface tension and inter-facial tension. Soap is an effective wetting agent unless the metal ions in the water or on the surface are sufficient to destroy its value. Alkalies, phosphates and silicates are less expensive, and in many cases more useful.

It is possible for wetting agents to be valuable for a number of railroad uses, but perhaps they would be most widely used in connection with detergents for cleaning purposes. Wetting agents are highly beneficial for the wetting of any surface, and consequently are of particular value in washing passenger-car equipment and the exteriors of locomotives. Certain wetting agents in combination with other materials have been used in removing oil accumulation from the interiors of boilers.

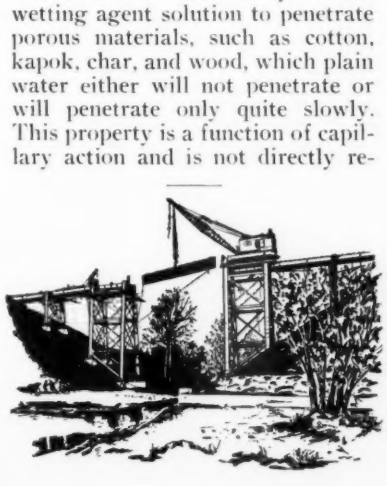
Any good detergent must have good wetting properties. A suitable wetting agent in combination with a good detergent applied to the surface to be cleaned, followed by emulsification of the wetted soil—generally best secured by mechanical action or agitation—and then followed by liberal rinsing, usually results in a satisfactorily clean surface.

They Put Out Fires Faster

By JAMES J. DUGGAN and HUGH N. McNAIR
Carbide and Carbon Chemicals Corporation, South Charleston, W. Va.

As we described recently in *Safety News*, wetting agents, when added to water in small amounts, contribute three principal properties to the solution. Each of these properties will be present to a greater or lesser extent depending on the wetting agent used. These properties are: (1) Penetration; (2) surface wetting; and (3) detergency.

The first is the ability of the wetting agent solution to penetrate porous materials, such as cotton, kapok, char, and wood, which plain water either will not penetrate or will penetrate only quite slowly. This property is a function of capillary action and is not directly related to lowered surface tension. However, lowered surface tension is necessary to produce penetration.



On the other hand, *surface wetting* is closely related to lowered surface tension. Actually, it is the ability of a wetting-agent solution to spread and creep over a surface. This action might be compared to the surface area covered by a pancake as opposed to that covered by the flat side of half an orange, the volume of which equals that of the pancake. The half orange represents a droplet of plain water which has a very high surface tension.

Detergency is the ability of a wetting-agent solution to cleanse and retain dirt particles in suspension so that they are not redeposited on the cleansed surface. Wetting-agent solutions in which this characteristic is most pronounced generally foam prolifically.

We have been making extensive tests of various wetting agents for some time to determine, among other things, their effectiveness in fighting fires. As a result of this experimental work, we have developed a proprietary compound—essentially a wetting agent—specially designed for fire fighting. The results obtained by the use of this penetrant, not only on large-scale tests, but also when used on actual fires by municipal fire departments, have indicated that on an average building fire, extinguishment can be effected much more rapidly and with from ⅓ to 1/5 the amount of water otherwise required.

In every case where the wetting-agent penetrant was used, smoke-generation during extinguishment was reduced and water damage was practically eliminated. On other types of fires, such as baled cotton and paper, the efficiency has been even higher than on buildings.

Of the three characteristics of wetting agents mentioned above, it would appear that penetration is the most important in relation to the extinguishment of Class A fires, which may be described as three-dimensional fires. By increasing the ability of water to penetrate into the involved material, wetting agents effect an attack in depth as well as in the other two dimensions. Undoubtedly surface wetting also plays a part. There may even be instances where this property is of equal importance.

Railway fires which are particularly susceptible to the use of "wetter water" include those in warehouses, freight cars, dumps, right-of-way or forest fires, and those involving flammable liquids.

Bridges Threatened by Floods

When bridges are threatened by high water, should they be loaded with cars of cinders, sand or coal, as may be available? Does the type of bridge make any difference? What is the effect of such loading?

No Use To Load Truss Spans

By R. B. CARRUTHERS

Assistant Supervisor of Structures, Southern Pacific Lines in Texas and Louisiana, Houston, Tex.

It has been my experience that when flood waters have risen over the lower chord and floor system and enough drift has accumulated, most truss spans fail through the center of the span from the lateral force alone, before their bearings leave the piers. In this case, if the lower chords of the trusses are under dead-load axial stress from loaded cars on the bridge and, in addition, are suffering bending stress from the lateral force, it seems to me failure will occur sooner.

It is the opinion of some that truss spans with their lower chords and floor system sufficiently submerged in the current leave their bearings first at the expansion end when the friction is overcome. I know of one through-truss span on stone-masonry piers that did not wash out in a flash flood until its top chord was almost submerged, and only then when the hip above the expansion end was struck by a floating house. The current was not too swift and there was little or no drift. This span went off the rock-masonry pier at its expansion end first, but took the top three courses of stone masonry with it, evidence that the span did not slip on its expansion end, but overturned. In a case like this, I believe that had the bridge been loaded, it would have remained in place.

In some swift streams at flood stage, when the bridge's floor system, deck and lower chord are submerged and drift has accumulated, the span will break up in the center under a heavy surge. Loading the bridge, no doubt, would overcome some of the uplift in its center from surge, but would increase the friction at its bearing and the span would ultimately fail through its center from the lateral force.

I do not believe that loading a truss span is of any value, nor is there any type of truss, conventionally designed, that would differ appreciably from any other when submerged under the same flood conditions.

On the other hand, loading a trestle, the piling of which has little or no penetration, will tend considerably to stabilize the structure and delay its overturning.

Loading Is Not Desirable

By I. H. SCHRAM

Chief Engineer, Erie, Cleveland, Ohio

The loading of bridges threatened by high water, with cars containing material of the kinds mentioned, is not desirable and may be harmful. In general, the effect is not advantageous, and observations of some washouts in recent years indicate that some undesirable effects occurred. There are four general reasons for this belief:

1. The amount of weight which can be added to a bridge by loading it with loaded cars is negligible compared to the forces exerted by moving water, except for relatively short-span and light bridges.

2. If the water gets high enough to exert force against the bridge superstructure, any cars standing on the structure, particularly if it is a through-truss bridge, only add surface against which the water can exert force. This added surface against which the water can act may result in the superstructure being washed out.

3. The superstructure of a bridge is seldom, if ever, washed out unless there is a failure of the substructure. Additional weight added to the bridge will not help in any way to prevent the abutments or piers from being undermined to such an extent that failure of the bridge occurs.

4. It is thought that, in the past, the undermining of the bridge piers may have been accelerated by the forming of eddies or whirlpools caused by swift currents striking cars that had been placed on a truss bridge at which the water rose above the track. The thought is that these cars interfered with the main current which, when reduced, caused undesirable currents and higher pressures against the river bottom. These factors, in turn, may have washed material out from around piers and caused their failure.

Proper anchorage for bridge spans is very important and helps materially in preventing the superstructure from being lifted off its foundations by high water. This is particularly true of small, light bridges. The practice of raising bridges on wood blocking and not providing adequate anchorage should be avoided where high water can be expected during certain periods of the year.

Uses for Highway-Truck Cranes

To what extent and for what purposes can highway truck cranes be used by the bridge and building forces? What capacities are best adapted? Cite examples of use.

Effective in Terminal Areas

By ENGINEER MAINTENANCE OF WAY

Cranes that are mounted on pneumatic tires and that can be operated without restriction on city streets or highways can be used advantageously in connection with both bridge and building work and roadway maintenance. This is particularly true of maintenance work in large terminal areas. The extent of usefulness of such equipment for "on line" maintenance work is limited to the extensiveness and proximity of roads and highways. Almost any types of general maintenance work to which cranes are adaptable can be handled by cranes mounted on pneumatic tires providing a roadway is available to the location of the work.

There are many different types of cranes with truck or pneumatic-tire mountings. There is even one type available on half-tracks. Some of these machines are too wide and too heavy for unrestricted highway travel; some are designed to travel rapidly for long distances; and others are capable of traveling only at slow speeds and are not suitable for long hauls. In some types all operations can be handled from one cab by one man—a distinct advantage under some circumstances. In others, where travel and hoisting must be done simultaneously, a driver is required in addition to a crane operator. With such choices available, a careful study should be made in selecting the type of crane best suited for the work it is intended to do.

The economy in using cranes of

this type stems from their "off-track" feature. Intangible savings result from their eliminating delays to trains, while concrete savings result from the fact that trains do not delay their operation and that the services of train and engine employees are not required as in the case of rail-mounted cranes.

Of the many uses we make of this type of crane, one of the most important is in the reconstruction of grade-separation structures. On this type of work they handle material of all kinds, especially steel members and heavy decking. On a neighboring railroad one of these cranes is used to operate a clamshell bucket to clean out underpass drainage systems. The clam had to be specially designed to fit in manholes, but the effectiveness of the operation has made it well worth the effort.

I know of one instance in which an overhead highway bridge burned and blocked the railroad. A truck crane, dispatched quickly to the scene, saved considerable money in clearing the railroad from the highway above. The same crane was used in economically reconstructing the bridge.

This type of crane is also effective in lowering the maintenance and construction costs of prefabricated concrete-block highway crossings. The economy that is possible in this operation has resulted in one railroad expanding its use of this type of crossing as being no more expensive to maintain than any other.

movement of trains under severe storm conditions.

There are improved types of bottled gas heaters now on the market designed especially for interlocking plants and outlying switches in territories where commercial gas is not available, and there is no question that the installation of such heaters is economically justifiable. In C. T. C. territory, or at points where interlocked switches are remotely controlled, it is possible to have these new-type bottled gas heaters wired so they can be started by a push-button control from a tower or dispatcher's office. This improvement certainly results in savings in man-hours that will more than cover, in a short time, the initial cost of installation.

Effectiveness of Switch Heaters

How extensive is the use of switch heaters on your road? What types are used? How effective have they been in meeting severe storm conditions, offsetting labor shortages, and reducing switch cleaning costs? Explain.

No Doubt of Effectiveness

By J. P. DATESMAN
Engineer of Track, Chicago & North Western, Chicago

Switch heaters of various types are in general use over our entire system. These installations are generally located at interlocking plants, C. T. C. switches and other important outlying passing-track switches. They are also used in classification yards in conjunction with car retarders.

In heavy-traffic territories in which there are many interlocked switches, in passenger terminals, and at other interlocking plants, switch heaters using commercial gas have been installed wherever the gas is available. In outlying classification yards at which commercial gas is not available, switch heaters using bottled gas take care of the car retarders and interlocked switches.

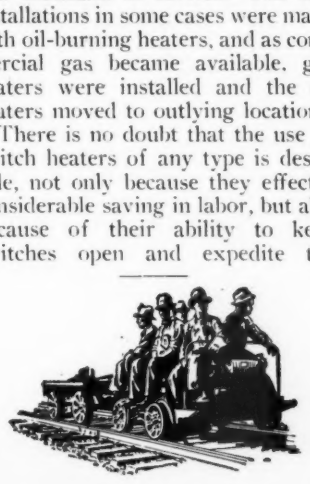
At outlying interlocking plants and at important passing track and other switches which are not in all cases interlocked, oil-burning switch-heaters are used. This type of heater has also worked well at spring switches which are generally located at the ends of passing tracks that are out in the country.

All types of burners, when properly installed and maintained, provide ample protection from the effects of severe snow storms with a minimum of labor cost. To secure the maximum efficiency from any type of switch heater, it is important that adequate drainage be provided to handle the water from melted snow, for should this water be permitted to accumulate it will soon freeze and defeat the purpose of the switch-heater installation.

Experience has demonstrated that it is essential to have a sufficient number of switch heaters in place to eliminate the possibility of snow arching over the burners, especially at outlying points at which switches are subjected to high winds.

The use of switch heaters was started extensively in the winter of 1942 and 1943 following tests conducted with a limited number the preceding winter, and we have continued to purchase additional heaters each season until now there are several thousand in service. The test installations in some cases were made with oil-burning heaters, and as commercial gas became available, gas heaters were installed and the oil heaters moved to outlying locations.

There is no doubt that the use of switch heaters of any type is desirable, not only because they effect a considerable saving in labor, but also because of their ability to keep switches open and expedite the



Definite Uses For All Types

By C. M. CHUMLEY
Engineer Maintenance of Way, Illinois Central, Chicago

Electric heaters at interlocking plants have been very satisfactory. The electric heater has one major advantage over other types in that the signal maintainer or leverman can place it in service quickly without waiting for section men. This heater is very desirable and efficient at interlocking plants and saves considerable delays to traffic which may occur otherwise while waiting for other types to be placed in service. Although electric heaters are the most expensive, they show the largest saving—often 25 to 30 per cent of the cost in labor charges per annum.

Gas heaters, using both artificial and natural gas, have been found to give excellent results and require less servicing than the oil-burning type. This type of heater is recommended where a natural gas supply is available or where artificial gas can be furnished without too great an expense. In the use of artificial or bottle gas, it is advisable to have a battery of tanks, one half of which is in service, and when this is used, the remainder can be cut in.

Gas heaters are less expensive in first cost to install, but require servicing and attention that electric heaters do not need. A spark-plug starting device has been developed that will reduce the amount of labor required, but there will always be more labor needed than in operating an electric device.

The oil-burning heaters are probably the oldest and most common in use. This type of burner is used at

locations where it is difficult to use other heaters. When using oil-burning heaters it is necessary to refill them after about ten hours of continuous burning. When the roadbed is frozen, it is frequently necessary to remove the water resulting from the melted snow. If this is not done the water freezes, necessitating the removal of ice to prevent melting snow from entering the burner. The oil-burning heater is the least expensive to install, but it requires much more labor attention and is not entirely satisfactory in high winds.

The use of weed burners in yards has been found to be one of the most satisfactory and economical methods of cleaning snow from switches, particularly in large terminals, including humps, yard leads and other points difficult to service with other types of heaters. These machines are used during the summer months for burning weeds, and at the end of the season they are assembled and overhauled for snow duty. In this way the maximum use is secured from the machines.

There is a definite use for all the burners listed and, with unstable labor and high wages, they are not only indispensable but are much more economical than cleaning switches by hand methods.

Signs Built by Civic Organizations

To what extent is it desirable to permit or encourage local Chambers of Commerce or other civic organizations to erect large signs on railroad property to supplement station signs in identifying towns for the traveling public? Are there disadvantages?

Helping Them Helps Us

By ROBERT M. VAN SANT
Director of Public Relations, Baltimore & Ohio, Baltimore, Md.

Generally speaking, we would be glad to permit Chambers of Commerce and other civic organizations to erect signs on B. & O. property advertising their communities. We believe that whatever helps communities on our lines usually helps the B. & O. That would certainly be true of signs on our right-of-way pointing out the advantages of any community. These might stress special facilities for industrial location, the fact that it is a good place to live, or, perhaps, a place of unusual historical interest.

I can think of only one or two situations which might make the erection of signs on our right-of-way inadvisable. That would be when they interfered in any way with safe operation, or when the signs might be offensive to property owners near the right-of-way in the vicinity of the sign.

It has been my observation that sometimes in unfamiliar territory on the railroad it is difficult to know just what city or town you are passing through. Station signs are not too conspicuous. The type of sign that you have in mind should have real informative value to train riders passing by.

Of course, certain formalities would have to be observed—something establishing the right to occupy railroad property, the fixing of maintenance responsibility, definitions as to liability and, in some cases, how local assessments or taxes would be handled—but these are details which could be worked out in each case to meet a particular situation.

Signs Are a Railroad Duty

By GEORGE M. CROWSON
Assistant to the President, Illinois Central, Chicago

One of the real attractions of daytime travel by train to many people is the pleasure of sitting by the window in perfect comfort and watching the world go by. Some railroads go to great lengths to cater to that pleasure—by providing observation and other lookout cars; by improving the visibility and controlling the glare in train windows; by having the train personnel visit with passengers, point out interesting sights, and answer questions; by having points-of-interest announcements made over loudspeaker systems; by making timetables easier to read and including information in them on the geography of the route; by providing guidebooks that tell a running story of what is to be seen along the way. These and many other added services all go to make daytime travel on a modern passenger train a never-failing delight to the many passengers who enjoy this distinctive attribute of travel by train.

One of the things that such passengers seem particularly to appreciate is the provision of signs on station buildings and/or platforms that can readily be seen from the passing train to tell them where they are. Such signs need to be located so they can be picked up at a glance. They should be reasonably uniform as to size and location so the passengers will recognize them readily, and, of course, they should be perfectly legible and adequately maintained to serve their purpose and for sake of good housekeeping too. Night lighting of such signs is a further refinement that will appeal to passengers who like to stay by the window after dusk.

Such signs as these must, of course, be provided by the railroad, and they make it unnecessary for Chambers of Commerce or other civic organizations to provide signs at or around stations purely to identify their community to the people on passing trains. If the local civic organization wishes to provide a sign that will go beyond mere identification and tell something about the community, the chances are that a location will be sought beyond the right-of-way line in order to make it visible longer and to more people.

There are other things that civic-minded individuals and organizations can do to appeal to the people whose introduction to their community is from the windows of passing trains. One of the most worthwhile things they can do is to improve the housekeeping along the streets and on the properties that adjoin the railroad. In connection with our good housekeeping program on the railroad, we have sought such local cooperation and have had very gratifying responses.

The question we are considering here is a double-barrel proposition. One involves the impressions we make for our railroads and for the communities along our railroads on the people who ride on our trains. The other involves our relations with the civic-minded people who live along our railroads and whose good will means so much to our companies and to all of us who work with them. It is smart public relations to make things pleasant for our passengers and neighbors too.

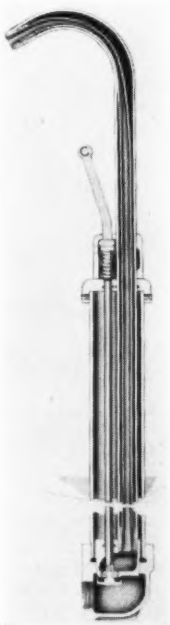
PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices

(For additional information on any of the products described in these columns, use postcards, page 115)

SELF DE-ICING SANITARY HYDRANT

THE Crane Company, Chicago, is introducing a "frost-proof" hydrant in which water is allowed to remain and freeze above the frost line, but which, when the valve is opened, is said to provide a free-flowing stream of water almost instantly. This feature has been made possible by a rubber tube placed under tension inside the riser spout of the hydrant for its entire length above the frost line.



The Crane frost-proof hydrant

When the water pressure is turned on the rubber tube expands against the inside of the riser spout, allowing a full column of water to flow. As soon as the water pressure is turned off the rubber tubing contracts to an internal diameter about equal to the diameter of a lead pencil. In cold weather the thin column of water inside the tube may freeze down to the frost line. When the valve is opened under such a condition, the water, it is said, flows up and around the "pencil" of ice, causing the ice to break up and flush out with the water, thus restoring a free-flowing stream almost instantly.

The valve of the hydrant is of the composition disc type, and is operated by a lever at the top of the hydrant, the lever having a cam at its lower end which thrusts the valve stem downward when the lever is moved forward. When the lever handle is released, spring action, combined with water pressure, returns the valve disc to the valve seat.

The hydrant is said to be completely sanitary, having no underground drainage holes whereby contamination could enter. The standard hydrant, 5½ ft. long, is installed with its valve mechanism 4 ft. below the surface and its outlet 30 in. above the ground. For variation in frost-line depths the hydrant can be furnished to order for burying to depths of 3 ft. and 5 ft. The open end of the spout, one inch in diameter, has a standard pipe thread for attaching a hose adapter.

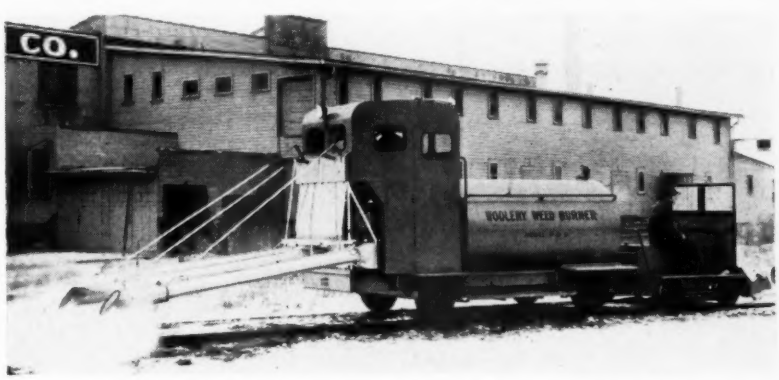
SWITCH THAWER AND WEED BURNER

THE Woolery Machine Company, Minneapolis, Minn., has developed a dual-purpose, on-track unit, known as Model PB-S which, while designed primarily for thawing snow and ice at switches, can be used with equal effect for burning weeds during the summer. The machine consists of a chassis of 8-in. channel-steel, with four flanged wheels, on which is mounted a cab and a 1,000-gal. fuel-oil tank. The burner tubes, three in number, project from the cab end of the outfit. When in operation the unit is towed by a motor car.

The cab, completely enclosed, is of all-steel construction with shatterproof glass windshield and windows. It is heated by engine exhaust pipes in the floor and is equipped with a dome light inside and a headlight outside on top.

The burner tubes, each 8 ft. long, can all be raised or lowered as desired by the operator within the cab. The outside tubes can be spread horizontally to obtain various widths of coverage, ranging up to 25 ft. All the burners are electrically ignited. Each burner can be shut off separately, or all three together, as desired.

The pump (rotary gear type) and the blower (8-in. steel pressure type) are operated by a 10-hp. Onan engine equipped with a self-starter and two 6-volt batteries. The maximum fuel consumption (No. 1, No. 2 or No. 3 fuel oil) is 50 gal. per hour for each burner. The entire unit weighs 6,000 lb. when carrying a full load of oil.



The Woolery Model PB-S combination switch thawer and weed burner

For additional information on any of the products described on this page, use postcards, page 115

SNOW-MELTING POWDER

SPECO, Inc., Cleveland, Ohio, is offering, for use on platforms, driveways, sidewalks and similar surfaces, an ice-and-snow-melting chemical powder, known as Ice Rem, one pound of which is said to have a thawing capacity equivalent to ten pounds of salt. The powder is applied by sprinkling it liberally over the surface, the amount necessary being dependent upon the thickness of the ice or snow. If used at the beginning of a snow or sleet storm, Ice Rem, it is said, will melt subsequent light snowfalls and keep surfaces continuously clean, yet leave no troublesome residue.

The manufacturer also recommends use of the powder for thawing frozen gutters, pipes, sewers, switches, etc., and when trucks or automobiles become stalled because of ice or snow conditions (a handful thrown under each rear wheel is said to provide traction and to keep wheels from spinning). The material is available in 9½-lb. cartons, 24½-lb. fiber pails and 90-lb. fiber drum containers.

CRANE ATTACHMENT FOR HEAVY-DUTY MOTOR CAR

THE Kershaw Company, Montgomery, Ala., is now offering for rail-laying operations a crane attachment for heavy-duty motor cars. Known as the Mocar-Crane, and having a capacity of 2,000 lb. with a two-part line, the unit consists essentially of a chassis, the rear end of which rests on the motor car and the front end on two flanged wheels; an A-frame truss mounted on the chassis directly over the wheels; a 22-ft. boom extending forward from the front end of the chassis, and a 6.1-hp. Wisconsin engine with single-drum hoist, clutch and foot brake.

The crane attachment is fastened to the mid-point of the motor car by pin connectors in holes which are slotted to facilitate movement of the unit around curves. The wheels, 16 in. in diameter, are mounted on a differential axle. The boom, raised and lowered by a hand hoist, is composed of two 5-in. trussed channel irons. The crane attachment can be removed from the track by hand, after pulling the motor-car connector pins, at a road crossing or motor-car set-off.

Laying track with the Kershaw Mocar-Crane

WATERPROOFING MASONRY PAINT

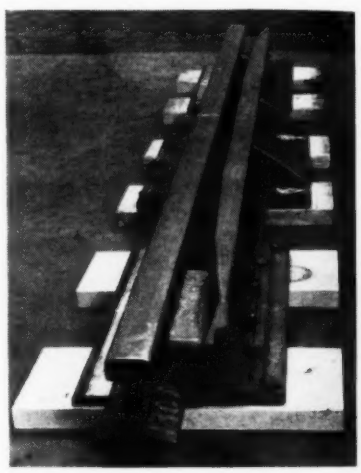
THE Arid-Crete Corporation, Cincinnati, Ohio, has developed a masonry paint, known as Formula 369, which is said to render all types of masonry surfaces impervious to water. It may be used on both interior or exterior surfaces, either above or below ground. When used on highly porous materials, such as cinder block or brick, or when used on outside walls below grade, the paint is mixed with a special filler, or aggregate. On other surfaces it is used as it comes in the container, after stirring.

The paint contains a very fine (500 screen mesh) waterproofing element which, it is said, upon application, is drawn into the voids in masonry by capillary action. As the other ingredients of the paint dehydrate, this element hardens and becomes an integral part of the masonry, both on the surface and in the voids beneath the surface. According to the manufacturer, when the paint is applied and cured properly, the results of the treatment are guaranteed.

Formula 369 is applied to a wet surface with a stiff brush, using a rotary motion. A second coat is applied within 24 hr. after application of the first coat. During the week after the second coat has dried, the surface should be sprayed lightly at least twice, and preferably three times. The later operation is very important for proper curing of the surface, and, according to the manufacturer, must not be neglected.

IMPROVED GUARD RAIL

SEVERAL new features have recently been incorporated in the design of the Hook-Flange Guard Rail,



The Bethlehem Steel Company's improved Hook-Flange guard rail

manufactured by the Bethlehem Steel Company, Bethlehem, Pa. The changes are designed to make this guard rail more sturdy and dependable.

The principal improvement is the addition of two heavy steel braces, the function of which is to increase the resistance to lateral thrust opposite the frog point. Another feature is the use of new double-shoulder tie-plates, of special design, to hold the running rail and the guard rail in the proper alinement. Finally, a welded reinforcing plate has been added to the guard rail to give extra rigidity to the entire assembly.

The hook-flange feature has been retained in the new design. This derives its name from the fact that the flange of the guard rail is curved so as to extend under the base of the running rail. Thus, the weight of trains prevents the guard rail from overturning, regardless of how great the side thrust may be.

TIE A STRING AROUND *TWO* FINGERS

1. The *highest* reactive value in the entire spring washer field!

2. *Fixed* tension ...the means for *equal* tension on all bolts!

VERONA

***Fixed* TENSION**
Triflex Springs

Woodings-Verona Tool Works
Verona, Pa.—Chicago, Ill.

The RAILROAD HOUR

ABC NETWORK • Monday Nights

THE MONTH'S NEWS

Happenings among the railways—the associations—the suppliers

Changes in Railway Personnel

General

H. H. Hill, general roadmaster on the Atlantic Coast Line, has been promoted to superintendent of the Richmond district, with headquarters as before at Rocky Mount, N.C., effective January 1.

Charles S. Sanderson, assistant general manager of the Atlantic Coast Line, was appointed assistant to president, effective January 8, with headquarters as before at Wilmington, N.C.

Edwin M. Pelter, track supervisor on the St. Louis division of the Southern, at East St. Louis, Ill., has been promoted to assistant trainmaster, with headquarters at Selma, Ala.

W. A. Pringle, assistant engineer on the Canadian National, with headquarters at Allendale, Ont., has been appointed trainmaster, with headquarters at Coteau, Que.

C. B. Bronson, assistant engineer maintenance of way—system of the New York Central System, has been promoted to maintenance of way assistant to the vice-president, with headquarters as before in New York. Mr. Bronson succeeds to the duties performed by **S. E. Armstrong,** engineer maintenance of way—system, who retired on December 31, 1948, as announced in the January issue. The position of engineer maintenance of way—system has been abolished. A photograph of Mr. Bronson and a sketch of his career were published in the September, 1948, issue in connection with his promotion to assistant engineer maintenance of way—system.

Engineering

R. E. Oberdorf, whose promotion to assistant to chief engineer of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, was announced in the December issue, was born on December 27, 1891, at Sunbury, Pa., and was graduated from Bucknell University. He entered railway service in November, 1915, as a computer on the Southern at Washington, D.C., and went with the Toledo, St. Louis & Western (now part of the Nickel Plate) as a transitman in 1916. Following military service in World War I, he became chief draftsman in the district engineer's office of the Nickel Plate at Frankfort, Ind., and subsequently held positions as assistant engineer and assistant district engineer at Fort Wayne,

R. E. Oberdorf

Ind. In 1940 he was appointed division engineer of the Clover Leaf district and in 1945 was transferred to Frankfort as division engineer of the Lake Erie and Western district, which position he held until his recent promotion.

Floyd R. Smith, assistant chief engineer of the Union, has been promoted to chief engineer, with headquarters as before at Pittsburgh, Pa.

H. W. Johnson, assistant engineer of the Southern at Cincinnati, Ohio, has been appointed assistant chief engineer of the Chicago Great Western, with headquarters at Chicago.

E. A. Vail, chief engineer of the Bamberger, at Salt Lake City, Utah, has retired after more than 56 years of service with the road. He is succeeded by **Eugene O. Humphrey,** engineer maintenance of way. Mr. Vail will continue with the railroad as engineering consultant.

George R. Burkhardt, chief draftsman of the Chicago, Burlington & Quincy at Chicago, has been promoted to engineer of standards, with the same headquarters, succeeding **C. W. Breed,** who has retired, as reported in the January issue.

G. A. Honey, division roadmaster of the St. Louis-San Francisco, with headquarters at Newburg, Mo., has been appointed assistant general manager, maintenance of way, of the Alabama, Tennessee & Northern, with headquarters at York, Ala.

Welcome W. Brown, assistant engineer of the New York Central at Cleveland, Ohio, **Charles W. Engle,** assistant division engineer of the Indiana division at Indianapolis, Ind., and **Thomas T. Minsker,** assistant engineer at New York, retired recently.

Frank R. Woolford, assistant superintendent of the Missouri Pacific Lines at Nevada, Mo., has been appointed engineer maintenance of way and structures of the Western Pacific, with headquarters at San Francisco, Cal., succeeding **Claude A. Combs,** who has retired.

Frank Riddell has been promoted to assistant engineer in the office of the chief engineer, Eastern region of the Pennsylvania, with headquarters at Philadelphia, Pa. **J. B. Smythe,** assistant supervisor of track on the Pittsburgh division, with headquarters at Cresson, Pa., has been appointed inspector, reporting to the chief engineer, Eastern region, at Philadelphia.

J. G. Smith, has been appointed assistant cost engineer of the Alleghany and Mountain subdivisions of the Chesapeake & Ohio, succeeding **R. S. Coleman,** promoted. **K. C. Morris** has been appointed assistant cost engineer of the Mountain and James River subdivisions, succeeding **K. E. Bomar,** whose promotion to assistant supervisor of track of the Mountain subdivision was announced in the December issue. All of the above have headquarters at Clifton Forge, Va. **Z. K. Miller** has been appointed assistant cost engineer at Columbus, Ohio, succeeding **C. M. Stewart,** who has resigned.

E. T. Gove, whose promotion to division engineer of the London division of the Canadian National, at London, Ont., was announced in the December issue, was born at St. Andrews, N.B., and entered the service of the Canadian National in 1918 as instrumentman, with headquarters at Toronto, Ont. In 1928 he was promoted to assistant engineer, and from 1941 to 1944 he served in a supervisory capacity in the engineering department, with the title of engineer in charge. In January, 1944, Mr. Gove was appointed assistant to engineer maintenance of way, and became assistant division engineer in April, 1948.

(*Please turn to page* 164)

Elevation: 9000 Feet
Satisfaction: 100%

Besides cutting cost of operation by better than 60% over the steam equipment it replaced, this 1000 h.p. Fairbanks-Morse road locomotive has set new records for availability for The Apache Railway Co. Elevations of 9000 feet have caused no noticeable loss of power. Typical performance: on 18 miles of 2½% ruling grade, loads are as high as 500 tons. Generous design of electrical equipment and the performance of the great Opposed-Piston Engine recommended Fairbanks-Morse diesel power to this railroad, as they must to you. Fairbanks, Morse & Co., Chicago 5, Ill.

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A name worth remembering

DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES
MOTORS • GENERATORS • STOKERS • RAILROAD MOTOR
CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS

Railway Personnel (Cont'd)

L. A. Loggins, who was recently appointed assistant chief engineer of the Texas & New Orleans (part of the Southern Pacific Lines) with headquarters at Houston, Tex., as announced in the January issue, was born on June 28, 1902, at Ennis, Tex., and entered railway service in May, 1920, as a coppersmith helper on the T.&N.O. at Ennis. He subsequently served as utility clerk, rodman, chainman, instrumentman, estimator-draftsman and engineer-accountant at various points until 1936 when he was granted a leave of absence to complete his education at the University of Texas. He received a Bachelor of Science degree in civil engineering in June, 1937, and returned to the T.&N.O. as senior instrumentman at Victoria, Tex. Mr. Loggins was appointed assistant engineer at that point in August, 1939, and assistant supervisor of bridges and buildings at Houston in June, 1942. The following year he was promoted to division engineer at Victoria, subsequently serving in the same capacity at Houston. In April, 1945, Mr. Loggins was advanced to assistant to the chief engineer at Houston, which position he held until his appointment as assistant chief engineer.

L. A. Loggins

Benjamin Chappel, who has been appointed district engineer of the Manitoba district of the Canadian National, with headquarters at Winnipeg, Man., as noted in the January issue, was born at Port Arthur, Ont., on June 8, 1903, and was graduated in civil engineering from the University of Saskatchewan in 1927. He first entered the service of the Canadian National on July 2, 1923, as a chainman and subsequently served as rodman, instrumentman and draftsman until 1949 when he became assistant engineer. He was promoted to division engineer of the Portage-Brandon division in 1944, and to special engineer at Winnipeg, Man., in 1945. He became engineer of track of the Western region in 1946.

Walter S. Brown, whose promotion to assistant engineer in the office of the chief engineer maintenance of way of the Baltimore & Ohio, with headquarters at Baltimore, Md., was announced in the December issue, was born on September 17, 1906, in Baltimore. He attended Johns Hopkins University, graduating in engineering in 1928, and entered the service of the maintenance of way department of the B.&O. in October of that year, being located at Wheeling, W. Va. Between 1928 and 1943 he served in several capacities at Wheeling and at Baltimore and in the latter year he was promoted to assistant division engineer, with headquarters at Connellsville, Pa., the position he held at the time of his recent promotion.

Walter R. Roof, engineer bridges and buildings of the Chicago Great Western at Chicago, has retired after 39 years of service with that road. Mr. Roof was born on April 15, 1881, at New Castle, Ind. He attended Purdue university from which he received a Bachelor of Science degree in civil engineering in 1906, and a Civil Engineer degree in 1934. He entered railroad service in June, 1906, as a rodman on the Chicago & North Western, and four months later has was appointed special engineer for the Pullman Company. In May, 1907, Mr. Roof became bridge and building draftsman for the Illinois Central, and in January, 1910, he went with the Chicago Great Western in a similar capacity. He was subsequently promoted to engineer of bridges and buildings, the position he held at the time of his retirement.

Walter R. Roof

F. E. Austerman, assistant engineer in the office of the chief engineer of the Chicago, Milwaukee, St. Paul & Pacific, has resigned to become acting assistant chief engineer of the Chicago Union Station at Chicago. He succeeds **C. E. Cox,** who has retired after almost 48 years of railroad service.

Mr. Cox was born on December 28, 1878, at Vallonia, Ind., and began his railway career in the engineering department of the Pennsylvania in 1901, joining the Illinois Central in 1904. He was employed by the Chicago, Milwaukee, St. Paul & Pacific the next year, and in October, 1915, entered the service of the Chicago Union Station, leaving that company in 1918 to work for the U. S. Railroad Administration. Mr. Cox returned to the Chicago Union Station in 1919.

Rufus C. Slocomb, whose promotion to engineer of roadway and track of the Baltimore & Ohio, with headquarters at Baltimore, Md., was announced in the November issue, was born at Vincennes, Ind., on November 26, 1889, and graduated from Rose Polytechnic Institute in 1912. He entered the service of the B. & O. in June, 1912, as assistant on the engineering corps at Cincinnati, Ohio, later serving in this capacity at Baltimore, Pittsburgh, Pa., and Wheeling, W. Va. In 1916, he was promoted to assistant supervisor on the Chicago division and in the following year he became assistant division engineer of the Philadelphia division, later serving in this capacity on the Baltimore and the Charleston divisions. Mr. Slocomb became assistant engineer of the Maryland district in 1919 and was promoted to pilot engineer of the building branch of the valuation department in 1920, where he remained until 1924, when he became assistant engineer—roadway and track, the position he held at the time of his recent promotion.

J. N. Fuller, who has been appointed principal assistant engineer of the Texas & New Orleans (part of the Southern Pacific Lines), at Houston, Tex., as noted in the January issue, was born on November 7, 1899, at Minneapolis, Minn., and received his higher education at Rice Institute. He entered the service of the T.&N.O. in June, 1919, as rodman and draftsman on the Beaumont division, with headquarters at Houston. From April, 1920, to January, 1942, he served successively as instrumman, engineer-accountant, office engineer and assistant engineer at Austin, Tex. In February, 1942, Mr. Fuller became roadmaster on the Dallas-Austin division, and in August of the same year he was granted a leave of absence to serve with the United States Army as captain during World War II. He returned to the T.&N.O. in December, 1945, serving as roadmaster until April, 1947, when he was advanced to senior assistant engineer in the office of the chief engineer at Houston, which position he held until his recent appointment as principal assistant engineer.

J. N. Fuller

(*Please turn to page* 166)

LINK-BELT SPEEDER SERVICE

PROTECTS YOUR INVESTMENT

Zack Laws, who has had 25 years' experience as an operator, recently made this brief, to-the-point comment on the K-370: "It's easy to handle. It's dependable. It gives greater quantity output because it's stronger on the crowd and faster on the swing compared with other machines."

•

The Link-Belt Speeder line includes twenty-five models, ranging up to 3 yard in capacity, some wheel-mounted, some on crawlers. In every size and type, Link-Belt Speeder advanced engineering is clearly seen in every detail, making for freer action, lower upkeep, long-life and profitable operation.

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See our distributor today. Let him show you a size and type to meet your exact needs. Or write for latest catalog.

•

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Keeping every Link-Belt Speeder Shovel-Crane in tip-top operating condition is one of the main objectives of Link-Belt Speeder and its far flung distributor organization. In every principal city in United States and Canada, and in foreign lands, a stock of parts and men trained in the servicing of Link-Belt Speeder products are in readiness to meet the needs of the user wherever located.

Link-Belt Speeder advanced engineering, honest construction and quickly available service add up to more profitable machine hours and greater returns on your investment. Your distributor will gladly show you the Link-Belt Speeder line of shovels, cranes and draglines, up to 3 yard capacity and explain the features which contribute to their outstanding performance. For instance—

SPEED-O-MATIC CONTROL

"Speed-O-Matic" hydraulic control permanently eliminates all "lost motion" — actuates clutches faster and more smoothly. Operators will tell you the "Speed-O-Matic" control relieves manual effort and there is little or no fatigue after a good day's work. Get the facts today—find out how you, too, can greatly increase your output.

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LINK-BELT SPEEDER

LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

Railway Personnel (Cont'd)

A. L. Fisher, division engineer of the St. Louis-San Francisco, with headquarters at Enid, Okla., has been appointed assistant superintendent-division engineer for the Western division.

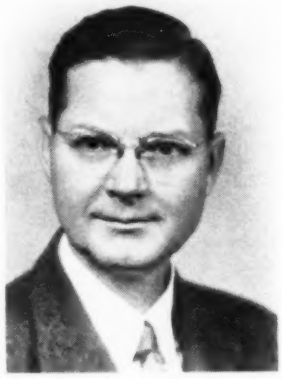
Frederick H. Lovell, assistant engineer of bridges and buildings of the Central region of the Pennsylvania, has been promoted to engineer of bridges and buildings, with headquarters as before at Pittsburgh, Pa., succeeding **J. F. Leonard,** who has been granted a leave of absence until July 1.

C. Paul Schantz, assistant chief engineer, maintenance of way, of the Pennsylvania at Philadelphia, Pa., has been appointed assistant to the chief engineer of the Eastern region, at Philadelphia. **H. J. Kerstetter,** engineer maintenance of way, of the Eastern Pennsylvania division at Harrisburg, Pa., succeeds Mr. Schantz as assistant chief engineer maintenance of way at Philadelphia, and is succeeded by **F. P. Filippelli,** division engineer of the Philadelphia division at Harrisburg.

G. M. Darby, engineer of track of the Denver & Rio Grande Western at Denver, Colo., has been promoted to locating engineer, with the same headquarters, succeeding **L. O. Doane,** who has retired. **W. H. Freeman,** roadmaster at Grand Junction, Colo., has been appointed engineer of Track at Denver to succeed Mr. Darby. **C. L. Schiller,** supervisor of structures at Salt Lake City, Utah, has been promoted to division engineer at Grand Junction in place of **J. R. Murray,** whose appointment as roadmaster-trainmaster is reported elsewhere in these columns. **L. F. Urquhart,** trainmaster on the Alamosa division, has been appointed assistant to the chief engineer at Denver.

James K. Gloster, whose promotion to division engineer on the Louisville & Nashville, with headquarters at Evansville, Ind., was reported in the November issue, was born at Middleboro, Ky., on May 29, 1910, and was graduated from the University of Kentucky in 1934 with a degree in mining engineering. He began his railroad career in December, 1936, as an instrumentman on the L. & N. at Middlesboro, serving in this capacity until March, 1940, when he became a draftsman in the bridge department at Louisville, Ky. Mr. Gloster was promoted to track supervisor in August, 1941, and subsequently held the positions of assistant engineer and assistant supervisor of bridges and buildings until June, 1946, when he was appointed assistant division engineer at Louisville. He became assistant engineer in the miscellaneous department at Louisville in September, 1947.

William S. Ray, whose promotion to assistant engineer bridges and buildings of the Central of Georgia with headquarters at Savannah, Ga., was announced in the December issue, was born at Blackville, S.C., on December 28, 1903, and attended Clemson college, graduating in civil engineering in 1924. He entered the service of the C. of Ga. on January 12, 1925, as a bridge and building inspector and was promoted to assistant engineer in 1928. He was made



William S. Ray

architect on January 1, 1941, and held that position until he was advanced to assistant engineer of bridges and buildings.

John R. Caswell, whose promotion to district engineer of the Algoma district of the Canadian Pacific, with headquarters at North Bay, Ont., was noted in the December issue, was born in Coldwater, Ont., on April 13, 1892. He

John R. Caswell

entered the service of the construction department of the C.P.R. in July, 1909, and later served in this department as chainman, rodman, instrumentman and transitman until September, 1918, when he became resident engineer of the London division. He was promoted to division engineer at Sudbury, Ont., in April, 1920, and subsequently served in this capacity at Smith Falls, Ont., and at Montreal, Que. He became assistant district engineer of the Ontario district, with headquarters at Toronto, in 1939 and later was appointed assistant engineer maintenance of way of the Eastern region, which position he held at the time of his recent promotion.

Edward M. Cummings, who has been promoted to assistant division engineer on the Baltimore & Ohio, with headquarters at Newark, Ohio, as noted in the December issue, was born on December 30, 1920, at Ludlow, Mass. He entered railway service in 1941 as a student track supervisor on the Boston & Maine and, later that year, became an inspector on the New York, New Haven & Hartford. He left railway service in 1943 to complete his education and attended Northeastern University, graduating in 1947. Mr. Cummings then became a safety engineer for the Aetna Casualty Company and served in this capacity until February, 1948, when he returned to railway service as assistant on the engineering corps of the Eastern region of the B. & O., the position he held at the time of his recent promotion.

Track

Harold Allen has been appointed general roadmaster of the Chicago Great Western, with headquarters at Oelwein, Iowa.

Ralph C. Billet, supervisor of track on the New York Central at Bucyrus, Ohio, retired recently after 47 years of service.

A. Blanchard, has been appointed roadmaster on the Canadian National, with headquarters at Hornepayne, Ont., and **E. A. C. Goldberg** has been appointed roadmaster at Allendale, Ont.

John Urlacher, track supervisor on the Atchison, Topeka & Santa Fe at Topeka, Kan., has been promoted to roadmaster at that point, succeeding **Ralph S. Ward,** who has been appointed track supervisor at Topeka.

F. D. Middleton, assistant supervisor of track on the Panhandle division of the Pennsylvania, has been promoted to supervisor on the Toledo division, at Toledo, Ohio, succeeding **R. H. Smith, Jr.,** who has been assigned to special duty in the office of the Comptroller, Philadelphia, Pa.

H. Huffman, supervisor of track of the Chicago & Eastern Illinois, with headquarters at Danville, Ill., has been promoted to the newly-created position of general roadmaster, with the same headquarters, and **J. E. Norman** has been appointed supervisor of track to succeed Mr. Huffman.

Eugene B. Francis, whose promotion to supervisor of track on subdivision 18, St. Lawrence division, of the New York Central, with headquarters at Gouverneur, N.Y., was noted in the December issue, was born on October 25, 1907, at Jersey Shore, Pa. He attended Pratt Institute of Technology, graduating in 1932, and entered the service of the N.Y.C. in September of that year, being assigned to the engineering corps of the Pennsylvania division at Jersey Shore. He was promoted to assistant supervisor of track on the River division, with headquarters at Newburgh, N.Y., in 1940 and was transferred, in 1945, to Fonda, N.Y., on the Mohawk division, where he was located at the time of his recent promotion.

(*Please turn to page* 168)

"Mr. Reade, I Have Called You on the Insistence of our Management"

COMING from the Chief Engineer of a very large system, this was surely a most cordial greeting.

"THAT IS INTERESTING—VERY INTERESTING—WHY?"

"Well, you did a bang-up job for us in 1945. The job was so good that we figured we could get by without your services in 1946—then the purse strings were pulled in 1947. With the arrival of the growing season of 1948, weeds were out of control and our maintenance program suffered all along the line. WE HAVE LEARNED THAT READE SERVICE IS NOT A LUXURY—IT IS A NECESSITY."

THEIR CONTRACT FOR 1949 is already in the bag.

Much experimental work is going on among railroads in this important matter of weed control work. This interest is constructive.

WE of course are fully informed relative to all new types of raw materials that may be incorporated in weed killing chemical. We provide the type of product best suited to conditions involved. However, wide experience and know how in weed control work is essential to benefits. We have the technical organization to assure railroads the desired results.

WE ARE PREPARED TO CO-OPERATE ALONG ANY LINE LOOKING TOWARD THE BEST POSSIBLE SERVICE TO YOUR COMPANY.

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PLANTS IN NUMEROUS RAILROAD CENTERS

Railway Personnel (Cont'd)

J. P. Tipton has been appointed assistant supervisor track of the Maumee district of the Chesapeake & Ohio, with headquarters at Walbridge, Ohio, succeeding **J. O. Cobb,** promoted.

W. J. Gill, roadmaster on the Denver & Rio Grande Western, with headquarters at Pueblo, Colo., has been transferred to Grand Junction, Colo., to replace **W. H. Freeman,** whose appointment as engineer of track is noted elsewhere in these columns.

C. C. Crenshaw, assistant to the division engineer of the Seaboard Air Line, with headquarters at Jacksonville, Fla., has been appointed assistant roadmaster on the Virginia division at Hamlet, N.C. **H. C. Exley,** system rail-gang foreman, has been promoted to assistant roadmaster on the Savannah-Jacksonville district, with headquarters at Savannah, Ga., succeeding **L. E. Hardin,** whose promotion to roadmaster at Tampa, Fla., was announced in the January issue.

J. W. Smith, Jr., general foreman on the Buffalo division of the Erie, with headquarters at Buffalo, N.Y., has been promoted to track supervisor on the Meadville division, with headquarters at Jamestown, N.Y., where he replaces **J. F. McCarthy,** who has been transferred to Cuba, N.Y., on the Alleghany division, succeeding **R. M. Hills,** who has been assigned to other duties at his own request.

T. C. Ellis, roadmaster on the Atlantic Coast Line, with headquarters at Jessup, Ga., has been promoted to general roadmaster, with headquarters at Rocky Mount, N.C., succeeding **H. H. Hill,** whose promotion to superintendent is noted elsewhere in these columns. **R. C. Sharpe,** acting roadmaster in charge of the Western Division rail gang has been transferred to Jessup as acting roadmaster, to succeed Mr. Ellis. **H. C. Wade,** acting roadmaster at Tarboro, N. C., has been appointed roadmaster with the same headquarters.

J. B. Hartranft, junior engineer assigned to the office of the engineer of tests, maintenance of way, of the Pennsylvania, with headquarters at Altoona, Pa., has been promoted to assistant supervisor of track—branch line on the Maryland division, with headquarters at York, Pa., succeeding **W. B. Super,** who has been transferred to the main line of the Pittsburgh division at Cresson, Pa. Mr. Super replaces **J. B. Smythe,** who has been appointed inspector in the office of the chief engineer, Eastern region, as announced elsewhere in these columns.

H. Arthur McRill, foreman on the St. Louis division of the Southern, has been promoted to track supervisor, with headquarters at Coapman, Ill., succeeding **E. M. Pelter,** whose promotion to assistant trainmaster is noted elsewhere in these columns. Mr. McRill was born on January 8, 1913, at Sims, Ill., and began his service with the Southern as a section laborer at Posey, Ill., in September, 1928. In February, 1933, he was made a welder helper on the St. Louis division, becoming a welder in February, 1935. He has been serving as foreman since May, 1944.

R. L. Peters, extra gang foreman on the St. Louis-San Francisco at Madill, Okla., has been promoted to roadmaster, with headquarters at Chaffee, Mo., and **C. A. Davis,** roadmaster at Oklahoma City, Okla., has been transferred to Fort Scott, Kan. Mr. Peters was born at Kinta, Okla., on June 11, 1911, and entered the service of the Frisco in June, 1933, as a section laborer at Madill. He was advanced to section foreman in March, 1939, and two years later he was further advanced to extra gang foreman, the position he was holding at the time of his recent appointment to the position of roadmaster.

J. R. Watt, supervisor of track of Subdivision 24, Pennsylvania division of the New York Central, with headquarters at Corning, New York, has been promoted to general inspector of track on the Lines Buffalo and East, with headquarters at New York. **Wolters Ledyard,** bridge and building inspector on the Boston & Albany, with headquarters at Pittsfield, Mass., has been appointed assistant supervisor of track on sub-Division 5, Mohawk division, of the New York Central, with headquarters at Albany, N.Y., succeeding **R. C. Swanson,** who has been promoted to supervisor, with headquarters at Corning, replacing Mr. Watt.

C. M. Kern, whose promotion to supervisor of track on the Piedmont subdivision of the Chesapeake & Ohio, with headquarters at Gordonville, Va., was announced in the December issue, was born at Clifton Forge, Va., on May 15, 1906. He entered the service of the C. & O. in March, 1929, as a junior rodman in the construction department and later served in this department as senior rodman, masonry inspector and instrumentman until December 15, 1942, when he was promoted to resident engineer. He was appointed assistant cost engineer in the maintenance-of-way department in August, 1945, and became assistant supervisor of track on the Mountain subdivision, at Clifton Forge, in September, 1946, holding this position until his recent promotion.

Bridge and Building

Frank Jones has been appointed superintendent bridges and building, of the Alabama, Tennessee & Northern, with headquarters at York, Ala.

John H. Parrish has been appointed assistant supervisor bridges and buildings on the Chicago & North Western, with headquarters at Winona, Minn.

J. H. Talbot, general foreman in the bridge and building department of the Canadian National, has been appointed bridge and building master of the Laurentian division, with headquarters at Quebec, Que., succeeding **J. Riddoch,** deceased.

W. T. League, master carpenter of the Cincinnati division, at Cincinnati, Ohio, has been transferred to the Eastern division, with headquarters at Canton, Ohio, where he replaces **F. L. Lee,** who, in turn, replaces Mr. League at Cincinnati.

A. C. Black has been appointed supervisor of structures on the Denver & Rio Grande Western, with headquarters at Salt Lake City, Utah, succeeding **C. L. Schiller,** whose appointment as division engineer is reported elsewhere in these columns. **R. B. Rosenberg** has been appointed assistant superintendent of structures at Grand Junction, Colo., succeeding **E. N. Haase,** who has been transferred to Pueblo, Colo.

F. D. Day, assistant master carpenter of the New York division of the Pennsylvania, with headquarters at Jersey City, N.J., has been promoted to master carpenter of the Monongahela division, at Pittsburgh, Pa., where he replaces **H. P. Greene,** who has been transferred to the Columbus division, with headquarters at Columbus, Ohio. Mr. Greene, in turn, succeeds **H. M. Dick,** who has been transferred to the Philadelphia division, at Harrisburg, Pa., replacing **L. I. Kennedy,** who has been granted a leave of absence because of ill health. **S. C. Walker,** junior engineer on the Philadelphia division, at Harrisburg, has been promoted to assistant master carpenter of the New York division succeeding Mr. Day, and **J. A. Taltavall,** bridge and building inspector on the New York division, has also been promoted to assistant master carpenter of that division.

Water Service

J. H. Stinebaugh has been appointed supervisor of water service on the Memphis division of the Illinois Central, with headquarters at Clarksdale, Miss., succeeding **M. J. Hughes,** who has been assigned to other duties.

Obituary

Cecil P. Moran, bridge and building master on the Canadian Pacific, at Nelson, B.C., died recently.

Steve Kirby, roadmaster of the Canadian Pacific, with headquarters at Lethbridge, Alta., died recently at the age of 60 years.

J. B. Armstrong, retired roadmaster of the Canadian National, died recently at Moncton, N.B. He was 64 years old at the time of his death.

Harold D. Van Vranken, chief engineer of the Jacksonville Terminal at Jacksonville, Fla., died recently of a heart attack.

H. A. Cassil, who retired in 1946 as chief engineer of the Pere Marquette (now part of the Chesapeake & Ohio), was struck and killed by an automobile at Detroit, Mich., on January 13.

(*Please turn to page* 170)

WITH OLIVER "Cletrac"

Cutting a grade or ditch along the right-of-way is a "clean-cut" job with an Oliver "Cletrac" crawler tractor. The positive control of the dozer blade assured by Oliver "Cletrac's" exclusive steering principle reduces lost time . . . eliminates the need for time-wasting centering of the tractor and dozer. With an Oliver "Cletrac," you travel a straight line . . . the off-center loads so common to dozing operations do not pull the tractor off-side.

The exclusive Oliver "Cletrac" steering principle lets you balance the pull of one track against the pull of the other. One track can be speeded up . . . the other slowed to compensate for the side drag of an off-center load. This feature, plus the easy-operating Heil dozer with its positive-acting front-mounted hydraulic pump, gives you fast, accurate control for a "cleaner cut."

Add to these outstanding features, the rugged construction, exceptional accessibility, and economical maintenance of Oliver "Cletrac" and you'll see why it's the right tractor for right-of-way work. For all the facts, see your Oliver "Cletrac" dealer or write us direct. The OLIVER Corporation, Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio.

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A complete line of Crawler and Industrial Wheel Tractors

"THE SIGN OF EXTRA SERVICE"

OLIVER Cletrac SALES SERVICE

APPLY BY BRUSH, DIP OR SPRAY

You Save on Maintenance Costs!

Keep cars rolling years longer . . . Provide essential protection to right-of-way equipment, bridges, buildings and other properties. Rust-Oleum coats metal . . . and dries firm—with a tough, *watertight*, enduring film that prevents rust by moisture, fumes, acids, heat and many other destructive elements.

Rust-Oleum can be applied directly to any rusting surface—after easy, time-saving preparation. *It outlasts ordinary materials two to ten times*, depending on conditions. For lasting satisfaction and extra profits specify Rust-Oleum on new and re-built cars . . . and out on the right-of-way where rust is costly.

Write for full information TODAY. Ask for Catalog No. 145.

HERE'S HOW RUST-OLEUM SAVES TIME AND MONEY:

IT GOES ON FASTER

Rust-Oleum saves 25% of the time normally required for application . . . and covers up to 30% more area.

IT CUTS PREPARATION

No sandblasting, flame cleaning or chemical rust "dissolvers" are required. Merely wirebrush to remove scale, dirt, etc. and apply RUST-OLEUM.

IT PROTECTS LONGER

Rust Oleum LASTS two to ten times longer than ordinary materials on most jobs. Every application gives maximum protection.

RUST-OLEUM CORPORATION

2417 Oakton Street **Evanston, Illinois**

Association News

Maintenance of Way Club of Chicago

The next meeting of the club will be held on February 28, and will be featured by an address by C. H. Paris, consulting engineer (formerly chief engineer, Chicago & Illinois Midland), Springfield, Ill., who will speak on the changing political and economic conditions in China, with particular emphasis upon the current railway situation. As a recent emissary to China representing Morrison-Knudsen, Inc., an international company of engineers and contractors, Mr. Paris has the latest word on a highly complicated situation. The meeting, which will begin with a reception at 6:00 p.m., will be held in Eitel's restaurant in the Field Building, Clark and Adams streets.

The January 24 meeting of the club, with an attendance of 148, was addressed by F. R. Layng, consulting engineer, Bessemer & Lake Erie, Greenville, Pa., who presented a most thought-provoking address on The Relationship Between Material and Labor in Track Maintenance.

(*Please turn to page* 172)

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 12-14, 1949, Hotel Stevens, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 15-17, 1949, Chicago. W. S. Lacher, secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—Annual Convention April 26-28, 1949, St. Louis, Mo. H. L. Dawson, secretary-treasurer, 1429 Eye street, N.W., Washington 5, D.C.

Bridge and Building Supply Men's Association—E. C. Gunther, secretary, 122 S. Michigan avenue, Chicago 3.

Maintenance of Way Club of Chicago—Next meeting, February 28, 1949. E. C. Patterson, secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—John S. Vreeland, secretary, 30 Church street, New York.

National Railway Appliance Association—Annual exhibit, Chicago, March 14-17, 1949, in connection with the A.R.E.A. convention. R. B. Fisher, secretary, 1 No. LaSalle street, Chicago 4.

Railway Tie Association—Annual convention, September 12-14, 1949, Peabody Hotel, Memphis, Tenn. Roy M. Edmonds, secretary-treasurer, 610 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 12-14, 1949, Hotel Stevens, Chicago. Elise LaChance, secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, secretary, 59 E. Van Buren street, Chicago 5.

Rear end of cleaning unit, showing disposal conveyor above, ejecting waste to the side, and delivery conveyor below distributing cleaned ballast.

Ballast Cleaner includes two units: a towing and digging unit shown at the right, and a Diesel-powered cleaning unit behind. An endless scraper chain passing beneath the track excavates the ballast, which is elevated first by the digging chain itself and then by a belt conveyor to vibrating screens, where it is freed of waste and conveyed to a chute for redistribution beneath the ties.

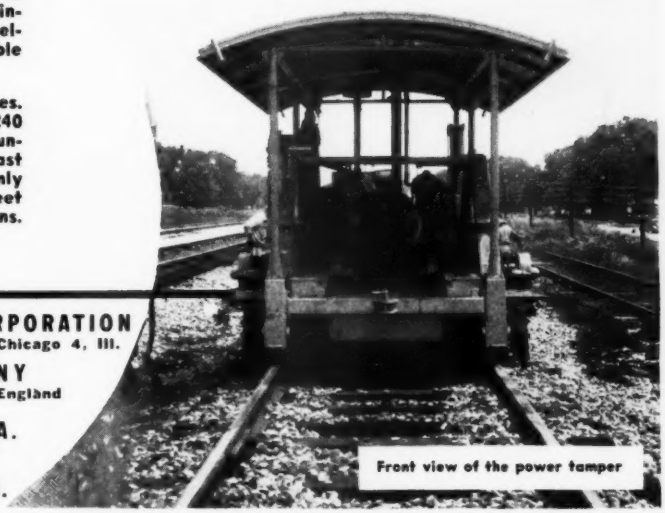
2 *new* machines

Also: Universal Bolt and Tie Screw Driving Machines, Rail Drilling Machines, Tie Drilling Machines, Pulsators, Motor Rail Trucks

The Matisa Automatic Ballast Cleaner and the Matisa Automatic Tie Tamper, both developed in Switzerland and experienced in track maintenance service in England, France, and Belgium in the past 12 years, are now available to American railroads.

Both are self-propelled on-track machines. Output for the Ballast Cleaner is 150 to 240 lineal feet of track per hour of actual uninterrupted operation, depending on ballast conditions. The Tie Tamper, requiring only one man to operate, will tamp 400 to 600 feet of track per hour under normal conditions.

Full details and work records on request.



Front view of the power tamper

The MATISA EQUIPMENT CORPORATION
206 S. Michigan Ave., Chicago 4, Ill.

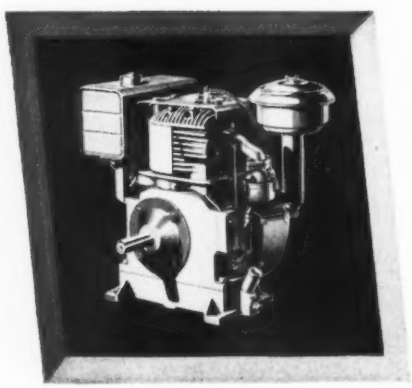
EQUIPMENT COMPANY
58 Victoria St., London S.W.1, England

MATERIEL INDUSTRIEL, S. A.
2 Grand Pont, Lousanne, Switzerland
30 Rue de Mogador, Paris, France

MATERIAIS INDUSTRIAIS, S. A.
277 Av. Rio Brance,
Rio de Janeiro, Brazil

Opposed pairs of tamping tools work from each side of a tie, vibrating rapidly while being forced toward each other until desired compactness of ballast under tie is attained.
Two complete tamping mechanisms (one on each side), each comprising 8 tamping tools working in pairs, 4 inside and 4 outside of rail, are raised and lowered by means of compressed air. They are mounted on the Tie Tamper, which is powered and propelled by a combustion engine

If You Have a Gasoline Engine Power Problem



"Preferred" Air-Cooled Power

Briggs & Stratton offers you advantages no other manufacturer of single cylinder, air-cooled engines in the world can match.

These are the engineering skill, knowledge, and counsel as well as the unequalled performance that come from *30 years of experience* — plus the advantages of a world-wide service organization. That extra experience, that extra skill assures you the best in design, materials, workmanship, and precision production.

This experience is yours for the asking. Our engineers are ready to counsel with you to help solve your gasoline engine power problems.

BRIGGS & STRATTON CORP., Milwaukee 1, Wis., U. S. A.

4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES
Preferred Power FOR INDUSTRIAL CONSTRUCTION RAILROAD AND FARM EQUIPMENT

Association News (Cont'd)

N.R.A.A. Progresses March Exhibit Plans

Plans for the exhibit of the National Railway Appliances Association, March 14-17, in conjunction with the Golden Anniversary convention of the American Railway Engineering Association, continue to grow and expand. More detailed reference to the exhibit, with a list of those companies which plan to participate as this issue goes to press, is included in the feature pages.

Roadmasters' Association

With committee work under way, looking to the annual convention in September, the Executive committee of the association will meet in Chicago, at the Chicago Engineers' Club, on Monday, March 14, beginning at 9:00 a.m., to transact association matters and lay plans for the fall convention.

Continuing an intensive drive for new members, A. G. Reese, district maintenance engineer of the Burlington, and second vice-president of the association —who is heading up the membership drive—urges the support of all members in obtaining new members on their respective roads. Application blanks can be secured either direct from Mr. Reese, at his headquarters at Galesburg, Ill., or from the secretary of the association, Elise LaChance, at 431 S. Dearborn, Chicago 5.

Metropolitan Maintenance of Way Club

The next meeting will be held in the Skyline room of the Hotel Sheraton, New York, on February 24. L. L. Adams, assistant chief engineer, Louisville & Nashville, will tell of recent experiences of his road with hurricane damage in the Gulf Coast area. His talk will be illustrated with slides.

Bridge and Building Association

Taking advantage of the A.R.E.A. convention and N.R.A.A. exhibit in Chicago during the week of March 14, President E. H. Barnhart has called a meeting of the Executive committee for Wednesday noon, March 16, to be held at the Engineers' Club, beginning at 12:30 p.m. With the technical committee work of the association well under way, attention of the Executive committee will be focused on a continuing drive for new members, under the direction of first vice-president, W. F. Martens, general foreman of bridges and buildings, Santa Fe, at San Bernardino, Calif. Applications for membership should be forwarded directly to Mr. Martens or to the secretary of the association, Elise LaChance, at 431 S. Dearborn St., Chicago 5.

American Railway Engineering Association

Most of the standing committees have finished their work for the year, with the result that none of them has scheduled

(*Continued on page* 174)

WARWOOD WORKMANSHIP
MAKES THE DIFFERENCE

WARWOOD
TRACK
TOOLS

Tamping Pick
WARWOOD
NO. 2-T

Spike Maul
NO. 3-T

When you purchase Warwood Track Tools, you can rest assured they are accurately forged and scientifically heat treated to meet A. R. E. A. specifications. And whatever the purpose for which they are designed, they will do the job well and withstand severe service. The high quality of Warwood Track Tools makes them the number one choice among careful buyers. Specify Warwood for complete satisfaction.

PICKS... MAULS... WRENCHES
BARS.... TONGS.... SLEDGES
ADZES... PUNCHES... CHISELS

WARWOOD
SINCE 1854
FORGED TOOLS

WARWOOD TOOL COMPANY
WHEELING, WEST VIRGINIA

Setting A New High
IN QUALITY
AND VALUE

TODAY'S Layne Well Water Systems and Vertical Turbine Pumps set an amazingly new high in long lasting quality and big dollar value. Years and years of constant improvements in design has given them unmatched overall efficiency. And along with high efficiency there have been many improvements in quality. All strain points have been made heavier and stronger. All bearing surfaces are now tougher and longer lasting. Controlled precision in manufacture has added more smoothness to operation.

All in all, your Layne Well Water Systems and Vertical Turbine Pumps of today produce more water at lower operation cost than ever before. Dependability in construction features is not limited to a season or two. They are there to provide service for years and years with little or no upkeep expense.

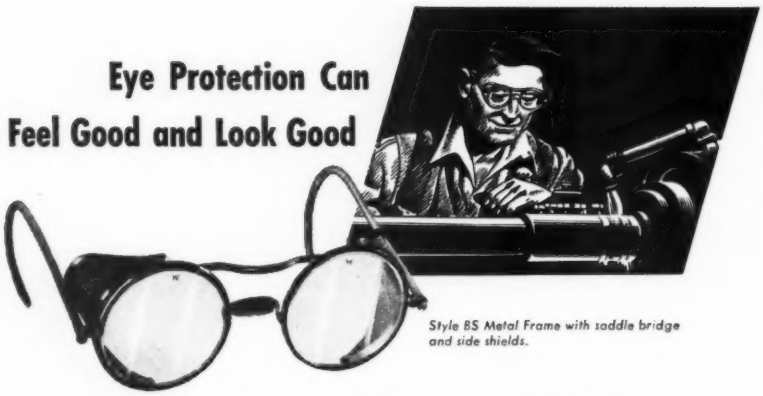
But you will also be interested to know that if service of any nature is ever required, the Nation-wide Layne organization has the facilities and know-how to put your system back in perfect order with a minimum loss of time.

For further information about Layne Well Water Systems and Layne Vertical Turbine Pumps, write for catalogs, and bulletins. No obligation. Address LAYNE & BOWLER, INC., General Offices, Memphis 8, Tenn.

LAYNE
WELL WATER SYSTEMS

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. * Layne-Atlantic Co., Norfolk, Va. * Layne-Central Co., Memphis Tenn. * Layne-Northern Co., Mishawaka, Ind. * Layne-Louisian Co., Lake Charles, La. * Louisiana Well Co., Monroe, La. * Layne-New York Co., New York City * Layne-Northwest Co., Milwaukee, Wis. * Layne-Ohio Co., Columbus, Ohio * Layne-Pacific, Inc. Seattle, Washington * Layne-Texas Co., Houston, Texas * Layne-Western Co., Kansas City, Mo. * Layne-Minnesota Co., Minneapolis, Minnesota * International Water Corporation, Pittsburgh, Pa. * International Water Supply, Ltd., London, Ontario, Canada * Layne-Hispano Americana, S. A., Mexico, D. F.

Eye Protection Can Feel Good and Look Good



Style BS Metal Frame with saddle bridge and side shields.

These safety spectacles with either metal or plastic frames feel good because they fit any type of face with that "made-to-order" look. Comfortable fit is assured by their light weight and the variety of bridge widths and lens sizes available. They are furnished with or without sideshields, and fitted with WILLSON Super-Tough*, flat or curved lenses for ample protection on many heavy-duty operations.

Style A Metal Frame with rocker nose pads.

WILLSON*

For complete information on these products and their application, as well as many more eye and respiratory protective devices, get in touch with your nearest WILLSON distributor or write us direct.

Styles W Pand W P S Plastic Frames with and without sideshields.

*T. M. Reg. U. S. Pat. Off.

WILLSON PRODUCTS, INC., 243 WASHINGTON ST., READING, PA.

LARGE or SMALL . . .

BURRO DOES EVERY JOB EFFICIENTLY, ECONOMICALLY

Whether the Burro is used to speed track laying or relocation, for bridge building, earth or ballast handling or on locomotive coaling jobs, it will handle every job more efficiently and economically—because Burro Cranes are built for railroad work.

Only* BURRO *cranes have:

- *Fast travel speeds—up to 22 M.P.H.*
- *Draw Bar Pull of 7500 lbs. (often eliminates need for work train or locomotive).*
- *Elevated Boom Heels for working over high sided gondolas.*
- *Short tail swing—will not foul adjoining track.*
- *Low overall height—Burro can be loaded and worked on a standard flat car (see illustration).*

Write for Bulletins

CULLEN-FRIESTEDT CO., 1301 S. Kilbourn Ave., Chicago 23, Illinois

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

Association News (Cont'd)

meetings to be held in February. Ballots for the election of officers were sent out with the A.R.E.A. News for February, which was mailed about the first of the month.

The February Bulletin (No. 479) contains the last of the committee reports and will be mailed about the fifteenth of the month. This Bulletin will include the reports of the Committees on Rail, Track, Roadway and Ballast, and Cooperative Relations with Universities. The March Bulletin, which will be the annual yearbook, will this year contain many special features that are of particular interest at this time in view of the fact that the association is celebrating its fiftieth anniversary. For this reason the yearbook will be of unusual size, containing about 350 pages.

Highlights of the program of the coming convention, which will be held on March 15-17 at the Palmer House, Chicago, are given in an article appearing in the feature section of this issue.

Supply Trade News

General

A 20-min., 16-mm. sound-color movie, **"Fire-Fighting with Wetter Water",** has been prepared by the **Carbide & Carbon Chemicals Corporation** for showing to municipal, volunteer, and industrial firemen, or to other groups interested in fire fighting and fire prevention. The movie is said to illustrate how water, made wetter by the corporation's new product, "Unox"—fire-fighting penetrant—knocks out fires three to four times faster than plain water. It depicts various tests run throughout the country by various fire services, demonstrating the speed with which "Unox" knocks down and extinguishes fires in cotton bales, wallboard, wooden shacks and various inflammable liquids.

Interested groups are invited to arrange for free showings of the movie by writing the Carbide & Carbon Chemicals Corporation, Room 328, 30 East 42nd street, New York 17.

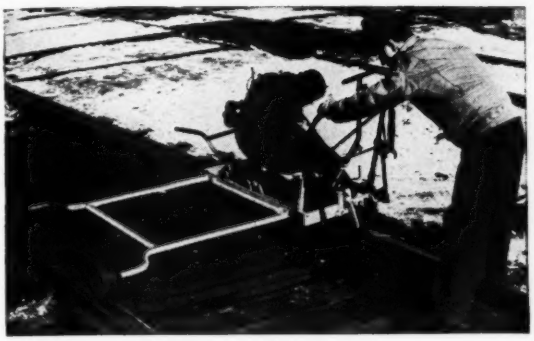
Personal

The **Peerless Pump Division** of the Food machinery & Chemical Corporation has announced the appointment of **J. W. L. Stone** as district manager of a newly-formed sales district at Omaha, Neb.

R. E. Whinrey, superintendent of the Dodge plant of the **Link-Belt Company** at Indianapolis, Ind., has been appointed to the newly-created position of assistant general manager at that plant. He is succeeded by **L. C. Heinlein,** assistant superintendent.

(*Please turn to page* 176)

GRIND AWAY TRACK WORK COSTS



with the

P-16-D Portable Stock Grinder

Now—add the new Model P-16-D Portable Stock Rail Grinder to your track equipment and get the latest machine for removing excess metal from switch points and stock rails. These advantages spell added savings for you:

- All grinding equipment is swivel mounted.
- Locking device holds grinding wheel securely when not in use. Prevents damage during transport.
- Grinder head can be swiftly adjusted to follow the alignment of switch point or stock rail.
- Hand wheel provides lateral adjustment. Coupled with double cup grinding wheel, grinder completes job on stock rail and switch point without turning machine around.
- Light and portable machine handles easily under traffic. Gets on and off track fast.

Save time . . . save labor costs by putting the P-16-D Portable Stock Grinder in your equipment shed. Further details sent upon request.

4354

Railway Trackwork Co.

3207 KENSINGTON AVE., PHILADELPHIA 34, PA.

AGENTS FOR

Kershaw-Railway Maintenance Equipment and Mark-Rite Paint Marker

BEALL Hi-Duty SPRING WASHERS are made especially to stand the strain of the heavy-duty rail service required by today's high-speed freight and passenger trains.

These washers are strong and tough, yet provide the necessary "springing action" required at rail joints, frogs and crossings.

We control every step of their manufacture—from the specification of the specially-developed formula and process used in making the steel to the forming, hardening, tempering and testing operations.

BEALL TOOL DIVISION *of Hubbard & Co.*

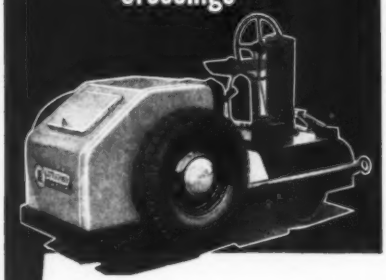
EAST ALTON, ILL.

Specialist Manufacturers of Spring Washers

BEALL Hi-DUTY SPRING WASHERS

MADE ESPECIALLY FOR RAILROAD SERVICE

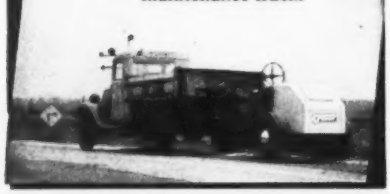
RAILWAY MAINTENANCE CREWMEN USE
the LITTLEFORD TRAIL-O-ROLLER
for Permanent Crossings



This small, compact, portable Trail-O-Roller makes blacktop crossings, parking areas, station platforms smooth permanent surfaces. The Trail-O-Roller can roll dozens of jobs in a single day—it travels as fast as the maintenance truck can go, yet it takes only 2 minutes to change it from the trailing to rolling position. And too, the compaction is as great as any 5 ton tandem roller.

If you're looking for a time and labor saving unit this Trail-O-Roller will give you the low cost way for doing permanent blacktop maintenance work. Many railroads are using the Trail-O-Roller today to save labor costs—you too can save with a Trail-O-Roller. Write for Bulletin No. 3.

Trail-O-Roller trails behind any maintenance truck.



LB LITTLEFORD
LITTLEFORD BROS., INC.
471 E. Pearl St., Cincinnati 2, Ohio

Supply Trade News (Cont'd)

H. L. Lansing, chief engineer of **The Rail Joint Company, Inc.,** has been elected vice-president, sales and engineering, with headquarters as before at New York. Mr. Lansing was born in Schenectady, N. Y., on June 17, 1907. He attended Union college in that city, graduating in civil engineering in 1928, and entered the service of The Rail Joint Company as a draftsman in November of that year. He was advanced to research engineer in 1939 and was further promoted to chief engineer in 1943.

H. L. Lansing

William E. Gahl has been appointed chief engineer of **Templeton, Kenly & Co.,** Chicago, to succeed **F. J. Jakoubek,** who has resigned to form his own company. Mr. Gahl, who joined Templeton, Kenly in 1929, has been active in steel and heavy industry in various engineering capacities for the last 18 years.

William E. Gahl

The **Dearborn Chemical Company,** Chicago, has announced the appointment of **E. Stewart Carlson,** formerly of the Chicago Tribune, as a member of its advertising staff.

W. Douglas Peters, assistant general sales manager of the **Reynolds Metals Company,** has been appointed central division manager, with headquarters at Chicago.

(*Please turn to page* 178)

FOSTER'S

Light-Weight
CORRUGATED
INTERLOCKING
STEEL-SHEET
PILING

SOLD UNDER THE L. B. FOSTER CO. WRITTEN GUARANTEE

RAIL
TRACK ACCESSORIES
PILING • PIPE
WIRE ROPE

SINCE 1902

L. B. FOSTER COMPANY

PITTSBURGH 30 NEW YORK 7
CHICAGO 4 HOUSTON 2
SAN FRANCISCO 4

Five convenient warehouses for prompt delivery

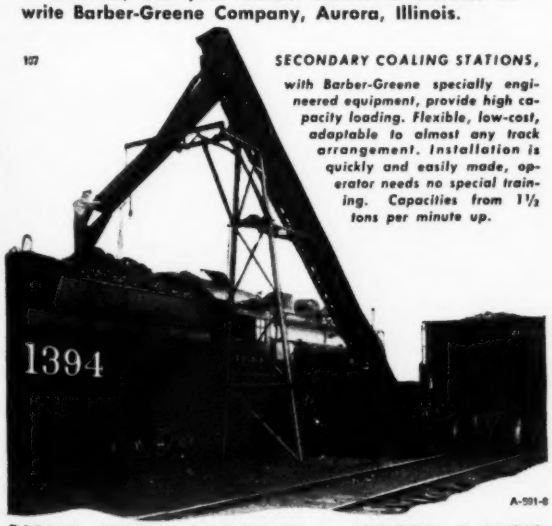
WRITE FOR FOLDER No. F-110-A

Keep yards open—trains moving

• Barber-Greene Railroad Snow Loader-Melter

New York . . . Milwaukee . . . Toronto . . . Chicago . . . where will massed drifts jam yards, clog rail centers next winter? Wherever blizzards and heavy snow may strike, railroads whose yards are equipped with the Barber-Greene Snow Loader-Melter can be sure that their yards will be cleaned faster, more effectively and at greatly reduced cost. This team has reduced snow removal costs for some roads as much as $6,000.00 per day over hand methods . . . and saved much more than that in schedules maintained.

This Barber-Greene unit consists of a BG-568 Snow Loader, a Melter Tank, with a capacity of 12,000 gallons, and the Heating Tank of 4,000 gallons capacity. Tanks are heated by direct injection of steam from the locomotive which pushes the unit. For additional information, see your Barber-Greene distributor or write Barber-Greene Company, Aurora, Illinois.



SECONDARY COALING STATIONS, *with Barber-Greene specially engineered equipment, provide high capacity loading. Flexible, low-cost, adaptable to almost any track arrangement. Installation is quickly and easily made, operator needs no special training. Capacities from 1½ tons per minute up.*

BARBER-GREENE COMPANY • AURORA, ILLINOIS

Barber-Greene

"U.S." Builds Electric Plants for every railroad need

"U.S." builds a *complete* line . . . . compact Portable units to operate power tools and provide light for emergency maintenance of way . . . . larger units for work trains . . . . dependable units for stand-by service on bridges and signal systems. Gasoline and diesel powered — ½ to 140 kw, A.C. and D.C. Write for detailed specifications.

UNITED STATES MOTORS CORP.
438 NEBRASKA ST.
OSHKOSH, WISCONSIN

ELECTRIC PLANTS

Supply Trade News (Cont'd)

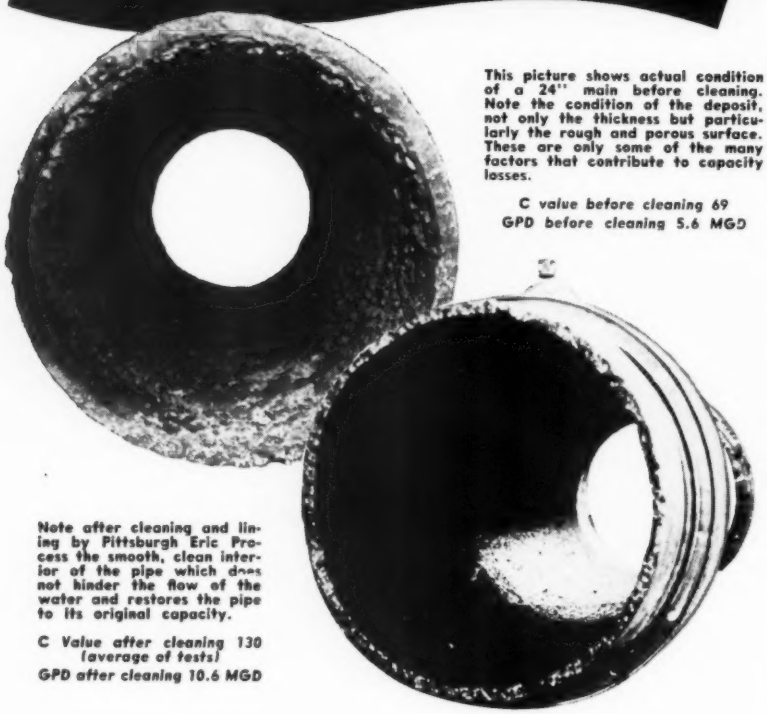
H. L. Francis has been appointed eastern traffic and transportation manager for the **Koppers Company.** Mr. Francis, whose headquarters are at Kearny, N.J., will continue his present duties with the gas and coke division. In addition, he will be the traffic representative in the New York-New Jersey area.

George O. With, manager of sales, construction industries, **Carnegie-Illinois Steel Corporation** (subsidiary of the United States Steel Corporation), at Chicago, has been appointed assistant vice-president of the **United States Steel Supply Company** (also as subsidiary of U. S. Steel). Mr. With is succeeded by his assistant, **Dwight L. Merrell.**

J. R. Brummett, assistant superintendent of the **American Lumber & Treating Co.'s** wood preserving plant in Baltimore, Md., has been appointed superintendent of that plant, succeeding **Colonel L. H. Harper,** who has retired.

The **Black & Decker Manufacturing Company** has announced the relocation of its Chicago sales and service station to 1100 West Jackson boulevard, with **R. G. Horner** as branch manager. The service station at Denver, Colo., has been moved to a new building at 1010 Bannock street, while a new factory service station will be opened in February at 1094 Gilbert avenue, Cincinnati, Ohio. **Elmer F. Sitton** is in charge of the Denver branch, and **Robert A. Brown** will manage the Cincinnati station.

CAPACITY LOSSES— THEIR CAUSES AND CORRECTION---



This picture shows actual condition of a 24" main before cleaning. Note the condition of the deposit, not only the thickness but particularly the rough and porous surface. These are only some of the many factors that contribute to capacity losses.

C value before cleaning 69
GPD before cleaning 5.6 MGD

Note after cleaning and lining by Pittsburgh Eric Process the smooth, clean interior of the pipe which does not hinder the flow of the water and restores the pipe to its original capacity.

C Value after cleaning 130 (average of tests)
GPD after cleaning 10.6 MGD

Whatever problems you have—Industrial—Municipal—Plant—Railroad—Maintenance—Supply—Engineering!!! If they pertain to water supply or sewage disposal a Pittsburgh Pipe Cleaner Company engineer can solve them. Our complete comprehensive rehabilitation program and engineering service is THE ANSWER. Write today for full details.

PITTSBURGH PIPE CLEANER CO.
133 Dahlem St., Pittsburgh 6, Pa.
BALTIMORE • BIRMINGHAM • BOSTON • BRADENTON, FLORIDA • BUFFALO • CHARLOTTE
CHICAGO • CINCINNATI • DETROIT • HOUSTON • NEW YORK • PHILADELPHIA • ST. LOUIS

Trade Publications

(To obtain copies of any of the publications mentioned in this column, use postcards, page 115)

Why Not Benefit by the Experiences of Others with Emeri-Crete Flooring—This is the title of a four-page bulletin, designated as No. 802, issued by the Walter Maguire Company, Inc. The bulletin contains an account of the experience of a large railroad with heavy-duty Emery flooring made with Cortland Emery Aggregate, installed on freight platforms.

International Diesel Crawlers—The International Harvester Company has issued a separate folder on each of four models of International Diesel crawler tractors, viz., the 29½-hp. TD-6, the 39-hp. TD-9, the 57-hp. TD-14, and the 80½-hp. TD-18. The folder contains design and performance information, specifications and pictures of the tractors in operation.

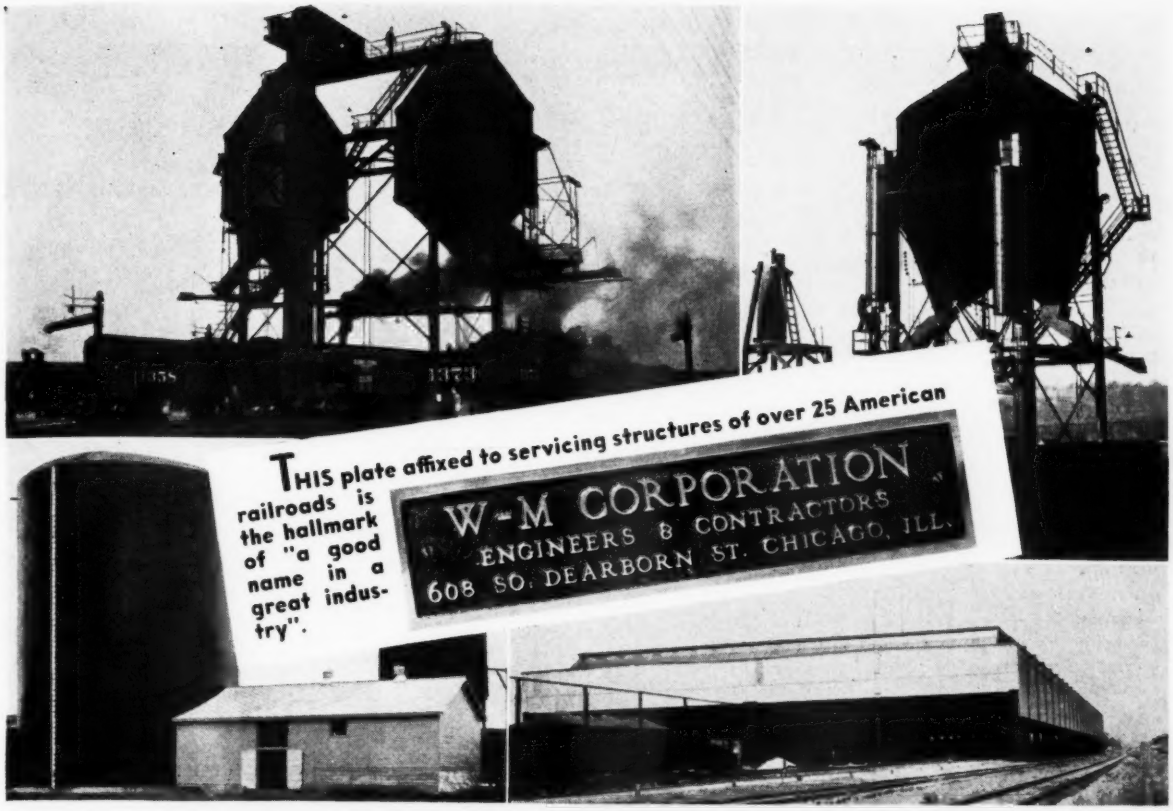
Foster's Steel Sheet Piling—The L. B. Foster Company has issued a six-page folder describing the company's new lightweight, interlocking, corrugated steel sheet piling. The folder contains five different drawings, with dimensions, of the piling, a physical-characteristics table, a discussion of the economies and advantages in using this type of piling, and 23 suggested applications.

One Ton or 1000—This is the title of a four-page illustrated folder issued by the L. B. Foster Company. The folder describes this company's line of pipe, steel sheet piling, rails and track accessories.

Specification for Dry Walls—The Western Waterproofing Company has issued a four-page illustrated folder, printed in two colors, describing processes for water-proofing both above-grade interior wall surfaces and exterior mortar joints of new buildings.

Truck-Mounted Shovel Crane—Book No. 2335, containing data on its HC-70 truck-mounted shovel crane, has recently been published by the Link-Belt Speeder Corporation. The catalog gives complete specifications, clearances, capacities and working ranges, and also contains a number of on-location photographs.

Grout Mixer and Ejector—The Union Iron Works of New Jersey Company, Inc., has issued a four-page bulletin, No. 195, describing their Union grout mixers and ejectors. Included in the pamphlet are dimensions and other data on this company's standard air-motor-driven machines. It also lists some of the applications of these machines, such as stopping and sealing leaks in tunnels, dam footings, sewers, etc.; strengthening and preventing settlement of footings and foundations, raising pavements, sealing mine and tunnel shafts, filling reinforced concrete pile or pole forms, rebonding cyclopean masonry bridge piers, etc. The back page of the pamphlet is devoted to illustrations of a variety of Union construction equipment.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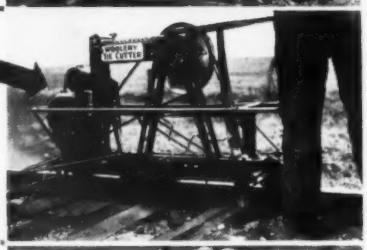
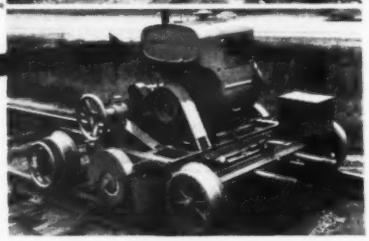
THE Kershaw Co., Inc., Montgomery, Ala., builds this Wisconsin-powered Kershaw Kribber, used in relaying operations.

IN a matter of minutes, the reciprocating blade of this Wisconsin-powered tie cutter slices through ties. Made by Woolery Machine Co., Minneapolis, Minn.



HERE is a Wisconsin-powered combination motor car and frog and rail grinder built by Northwestern Motor Co., Eau Claire, Wis.



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Like the builders of the diversified equipment above, when you specify Wisconsin Heavy-Duty Air-Cooled Engines, *you specify dependability that matches the reputation of the equipment itself!*

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- Flywheel fan cools at temperatures to 140° F. yet operates perfectly in sub-zero weather.
- Positive jet and spray oil system . . . no grease or oil fittings.
- High tension magneto with impulse coupling . . . for quick cold-weather starts and dependable, continuous operation ignition.

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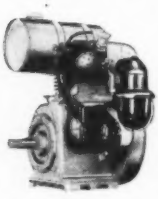
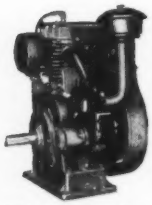
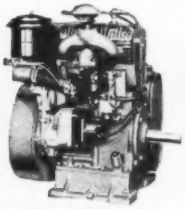


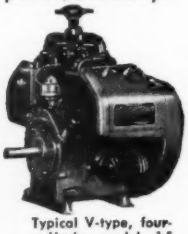
Typical 4-cycle, single-cylinder model, 2 to 5 hp.



Typical single-cylinder model, 4 to 9 hp.



Typical two-cylinder model, 7 to 13 hp.



Typical V-type, four-cylinder model, 15 to 30 hp.

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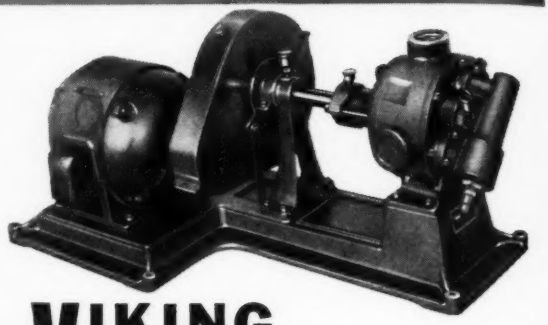
MILWAUKEE 14 WISCONSIN

MORE OF THE THINGS YOU WANT in a ROTARY PUMP



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1 Fins prevent turning.
2 Fins seat without side pressure.
3 Drives easily.
4 Same size hole makes better installation.
5 Washer nut stops seepage and locks through nail hole.
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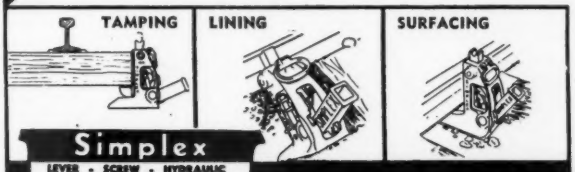
Simplex

15A UNIVERSAL TRACK JACK

Improved design of this new 15A Universal Jack utilizes an enlarged toe lift 2½" x 3¼" to permit lifting at the end of ties without cutting into bottom of tie. No interference in tamping through the complete panel. Minimum height of toe lift is 2¼". Capacity 15 tons. Height 11". Lift 5". Weight 41 lbs.



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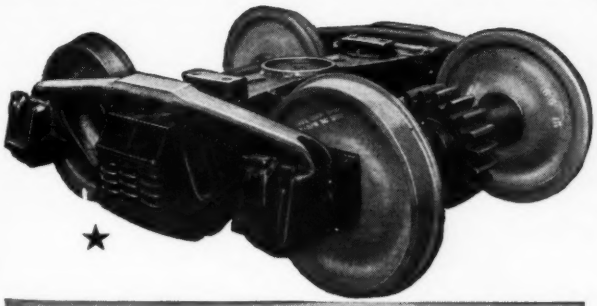

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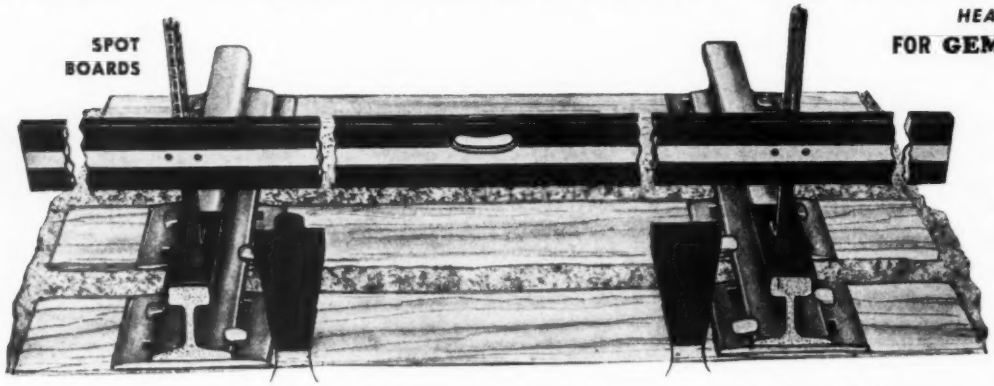

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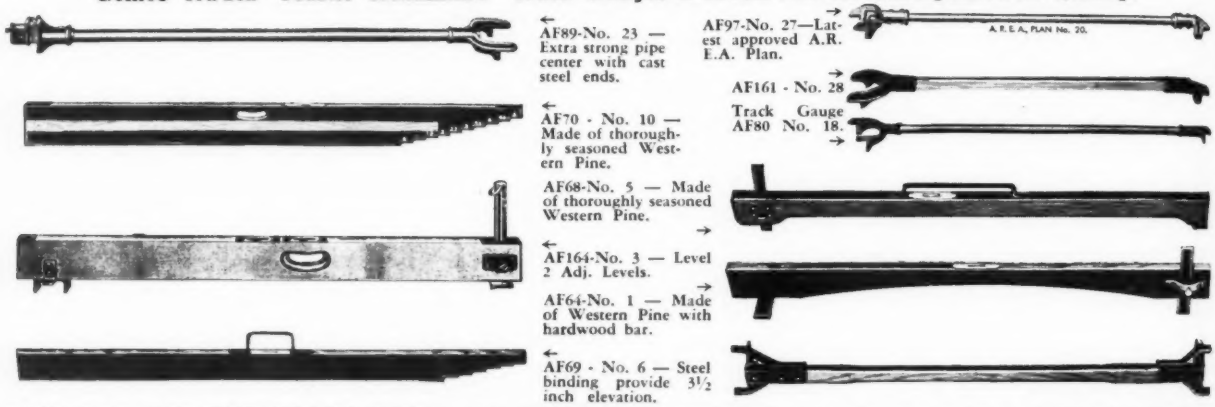

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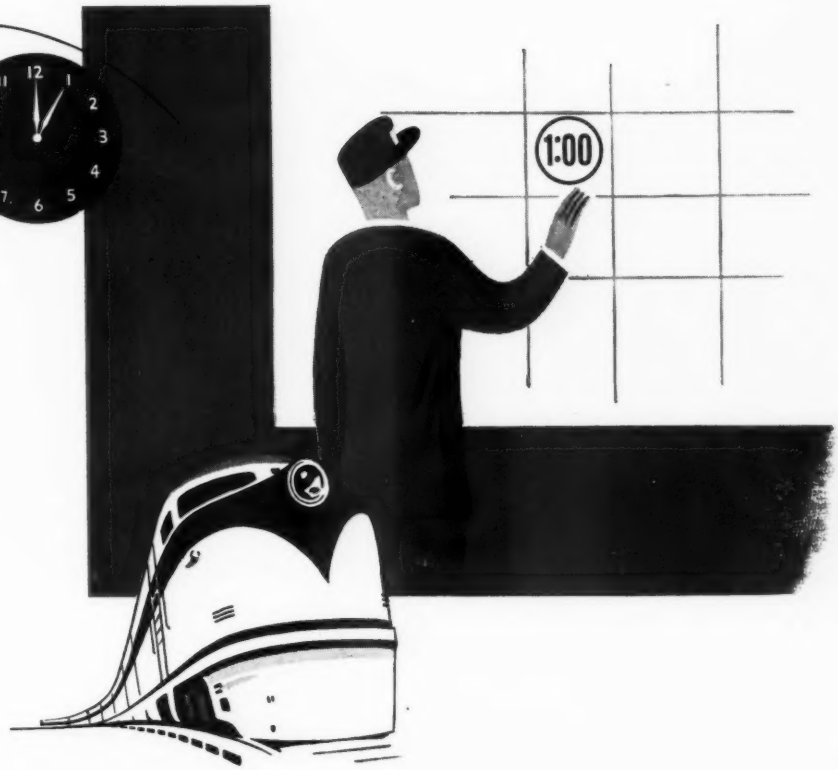

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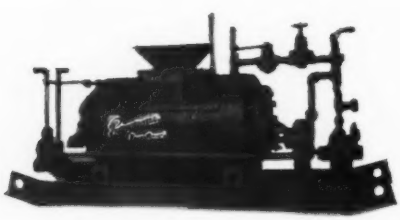

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